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# The

# Story of Wool

by

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With a Foreword by

SYLVAN I. STROOCK

1947

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# CONTENTS

PAGE

FOREWORD . . . . . . . . . . . . . . . . . v

MAN LEARNS ABOUT WOOL . . . . . . . . . . 1

SHEEP AND THEIR ANCESTORS . . . . . . . . . 8

THE MERINO SHEEP . . . . . . . . . . . . . 18

ALTERATION OF FLEECE . . . . . . . . . . . 29

WOOL AND ITS ALLIES . . . . . . . . . . . 38

WOOL AND WORSTED . . . . . . . . . . . . 46

FELT, AN ANCIENT FABRIC . . . . . . . . . . 52

WOOL AND SWISS LAKE DWELLERS . . . . . . . 60

WOOL IN EGYPT AND INDIA . . . . . . . . . 62

WOOL AND THE HEBREWS . . . . . . . . . . 66

WOOL IN MESOPOTAMIA . . . . . . . . . . . 76

WOOL IN GREECE . . . . . . . . . . . . . 82

WOOL IN ROME . . . . . . . . . . . . . . 90

WOOL IN MEDIEVAL ITALY . . . . . . . . . . 98

WOOL IN SPAIN . . . . . . . . . . . . . . 113

WOOL IN FRANCE . . . . . . . . . . . . . 119

WOOL IN FLANDERS . . . . . . . . . . . . 126

PAGE
MONASTERY WOOL . . . . . . . . . . . . . 137
WOOL IN ENGLAND . . . . . . . . . . . . . . 146
CLOTH GUILDS OF EUROPE . . . . . . . . . . . 205
ENGLISH CLOTH GUILDS . . . . . . . . . . . . 216
WOOL IN IRELAND AND SCOTLAND . . . . . . . . 228
WOOL IN AMERICA . . . . . . . . . . . . . . 233
WOOL IN PERU . . . . . . . . . . . . . . . 264
WOOL IN AUSTRALIA . . . . . . . . . . . . . 268
CASHMERE . . . . . . . . . . . . . . . . . 272
MOHAIR . . . . . . . . . . . . . . . . . . 276
CAMEL . . . . . . . . . . . . . . . . . . 279
LLAMA . . . . . . . . . . . . . . . . . . 285
GUANACO . . . . . . . . . . . . . . . . . 288
VICUNA . . . . . . . . . . . . . . . . . . 290
ALPACA . . . . . . . . . . . . . . . . . . 293
HYBRID CAMELOID FIBERS . . . . . . . . . . . 296
MISCELLANEOUS FIBERS AND FURS . . . . . . . . 297
ORIGIN OF THE NAMES OF WOOLEN FABRICS . . . . 300
BIBLIOGRAPHY . . . . . . . . . . . . . . . 303

# FOREWORD

THE STORY of animal fibers is the story of the domestication of animals to the will of man, and the discovery, in prehistoric times, of their utility in other forms than food. As man absorbed these facts and later evolved crude equipment to weave various animal fibers into cloth, he, to a great extent, abandoned the wearing of animal skins and even changed his dependence upon *felt,* which, in all probability, is the most ancient form in which wool was used by man.

Without wool, in its phases as *felt* and as woven cloth, the development of various ancient peoples who preceded the Chinese, Indian and Eastern Mediterranean civilizations, would have been retarded. It is known that early Neolithic man was familiar with wool, and it is a historical fact that Swiss Lake dwellers not only utilized it for clothing but also raised an early form of Caucasian sheep, herding them on plains which were near their pile dwellings.

At first man produced coarse, rough fabrics, but as he perfected the original crude looms, he was finally able to weave various forms of wool into cloth of remarkable fineness. As early as 3000 B.C., a clearly defined Mesopotamian style of woolen dress, too involved for home manufacture, led to the use of more or less skilled textile specialists, which in turn, developed into a State monopoly, forming an important segment of State revenue.

Although the word *wool* has been specifically given to fleece obtained from various types of sheep, it can, with equal correctness, be applied to the fleece of a wide variety of mammalia of which Angora and Cashmere goats, the camel, vicuna, alpaca and other animals are members.

At one time or another, the rearing of sheep and the manufacture of their fleece into cloth were prominent household occupations in Greece, Rome and their many colonies, but expansion of this industry on an almost national scale occurred first in England, both before and after mechanization of English textile mills.

This unusual, clear-cut story of wool as written by my friend, William F. Leggett, an expert in the textile field and author of numerous authentic and accurate stories on various textile fibers, fabrics, dyes, etc., reflects long study and careful gleaning of facts relating to wool and provides a historical background for those who are interested in this phase of the ancient textile industry. Undoubtedly, a deeper understanding of the habits and culture of ancient craftsmen may prove an incentive for individual textile artistry in this modern machine age.

SYLVAN I. STROOCK
Author of *The Story of Camel Hair, The Story of Vicuna, Llamas and Llamaland, The Story of Cashmere.*

# MAN LEARNS ABOUT WOOL

UNTOLD AGES AGO, a new species of animal, later called man, appeared on earth. He was the latest arrival, and no one, correctly classified as Hominidae, was known prior to the Pleistocene or Ice Age. Although scientifically classed as unstable and, in spite of the fact that it was necessary to wage a tremendous struggle to exist, he had a meteoric rise. Before he finally became stabilized into what approximates the human being we know today, over a dozen species similar to his type developed only to perish during the subsequent million years. Where are the first crude, giant men of China and Java? Where are the Neanderthals who once roamed from Spain to the Levant, and the intelligent, capable, finely developed Cro-Magnons, the so-called first modern men of barely twenty-five thousand years ago? Nature found it impossible to keep man static, for evolution is a restless mistress, ever searching for the best.

If we accept the "missing link" theory of some anthropologists who declare that man is a biological offshoot from a parent anthropoid stem, the Dryopithecus, or forest ape, who, about one million years ago, roamed from India to Gibraltar, then we can envision a remote ancestor about five and one-half feet high, having a short, thick trunk which was carried far from erect, because he usually preferred to travel on all fours, resting his weight on his knuckles. He normally sought concealment in forest thickets and, at first, was almost completely covered with hair, which nature had provided as protection against cold, rain and the insects of the forests, which had preceded him there by millions of years. However, as man developed into a larger, more intelligent and more adventurous being with a dilating horizon, he lost most of his original covering of hair because he spent more time in open country and along the banks of rivers and lakes.

This new animal was remarkable mainly because he refused to conform to his initial environments as had all his contemporaries. He created what may be called artificial environments for himself and in them, he led an artificial life. Man, alone, was the only form of life who, possessing originality and mental vigor, wondered whence he came and what it was all about. It was this ability to coordinate mind and action that brought him mastery and multiplied his original strength by artificial means, so that he was able to shape his environments to his own purpose. He also was the only animal endowed with necessary skill and intelligence to become a creative being and to design adequate artificial covering for dress, when the need for it arose. After he learned to protect himself with crude types of dress, he widened his periphery of activity, becoming the dominant species of animal life. It is not known how he, of all animal life, should have been the one to evolve thoughts, but it was this which made the difference in his fate.

As man gradually worked his way to self-assertion, a developing curiosity and almost childish imitativeness made him a persistent explorer in the realm of nature, and he gradually recognized natural sources from which could flow a more agreeable life. Slowly he learned to profit from a friendly sun, a fertile soil and servile animals that he domesticated, and because he was becoming fixed in habitation, he unconsciously opened the door to a permanent civilization.

For countless ages, however, man's existence was devoid of social phases. In practical isolation, he subsisted upon roots, berries and a variety of insects palatable to his omnivorous appetite. He occasionally also fed upon raw meat when he found a dead animal, or one which he could slay. A developing brain led him to use sticks and clubs, and eventually to shape pieces of wood, and even rocks, into implements for hunting.

We should remember that primitive man was long forced to retain a semi-civilized state because he was not familiar with metal from which to fashion protective weapons and tools for husbandry. However, he was fairly well advanced when he felt the impulse for adventure and took the first step in a rhythmic succession of migrations and settlements that, during succeeding centuries, scattered large groups of primitive people to many parts of an unknown world, in which he ultimately maintained a fixed habitation so necessary to an agrarian life.

Early civilization developed, and long remained static, close to a permanent isotherm of 70° "where man would neither shiver nor perspire when at rest" and here, for centuries, he made his home. When, however, he learned to make fire at will, this discovery had a tremendous effect upon his traditional habits, for now, either in small groups or in tribes, he was able to migrate to colder and often harsher regions where there were better hunting and fishing. These early migrations may have been in accordance with the Malthusian theory that population increases more rapidly than does food supply and thus corroborate the concept of Herbert Spencer that progress is not an accident but a part of nature. Anyway, both primitive and medieval migrations were inspired mainly by a search for food or for land which could be used to raise food. How widespread these ancient migrations were is proven by the discovery of Asiatic jade in Swiss Lake dwellings and the finding of a shell peculiar to the Indian Ocean among bones in a prehistoric cave. A fragment of ancient cloth is often mute evidence of a culture which may have originated at some distant point and is additional proof of man's tedious but steady advance from semi-savagery to a primitive form of civilization. The twin elements of fire and clothing permitted primitive man to materially widen his original environments and to overcome the necessity for seasonal migration, so habitual among lower animals.

The origin and development of clothing, as it slowly came to perfection among scattered ethnic groups, is a fascinating episode in the story of man, for it is the fusing of a romantic imagination with historical facts, many of which took place before human memory had congealed from legend into records. In widely separated parts of the world, isolated racial groups of men unconsciously became explorers in the realm of nature and ultimately succeeded in identifying many sources from which could flow a more complete and comfortable life.

When the primitive Homo sapiens left his original home in the forest, he answered the need for protecting his body by utilizing skins of the large animals when he came upon them after they had died, or when he was able to kill them in close combat. The latter called for courage and physique, but man's superior intelligence and reason enabled him to kill wild beasts many times his own size. Of course, these skins could not be used for food, and so, although raw, ugly and often blood-stained, they were used for clothing as early as the Paleolithic Age. These skins were dried. Then, with such crude flint and stone tools as were at their command, these ancient men scraped the flesh from the hides, exposed them to sun and air for curing and then made them pliable for wear by beating them with heavy sticks. When worn, the skin was draped around the body in an oblique position from left shoulder to the knees, permitting the right arm to be free. The ends of the skin were held together by sharp thorns until, at a much later date, man learned to sew the edges together with a sharp bone for a needle and strong, fine vegetable fiber for thread. Quite possibly the inner surface of the skin was given a crude touch of color, for on the walls of Paleolithic limestone caverns in France and Spain, dating about fifteen thousand years ago, fascinating drawings of animals in red and yellow ocher have been discovered. Undoubtedly, man attempted to control his game supply through this artistic sorcery.

Neolithic man also dressed chiefly in skins. However, he is credited with devising sharp objects like pins, made from jagged animal bones, and clasps which he used to draw together the folds of his animal skins to obtain additional warmth. When man finally learned to use the fibers of animals and vegetables for clothing, he was able to replenish his meager wardrobe without danger or effort. This new type of garment could easily be cleaned, which meant that it could be used for a much longer period.

It is not accurately known when man discovered that the fleecy undercoat of sheep could be converted into warm clothing. During the long interlude between the Old and New Stone Ages, man had progressed to a pastoral type of existence, and his newer method of living called less and less for predatory hunting, as a constant supply of food was present in his flocks of sheep and goats, which he had succeeded in domesticating. This step was his first experiment in animal husbandry and was probably as strange to him as it was to the animals. Some authorities believe that the dog was the first wild animal to be domesticated by man and that, in accomplishing it, primitive man unconsciously demonstrated keen judgment, for without trained dogs there could be no extensive pasturage and protection of sheep. In taking these two important steps, primitive man was quite unaware of the fact that they were really a milestone in human progress. Sheep raising and shepherding became one of man's earliest organized occupations, and the days and years of thousands of ancient shepherds were spent in wandering to and fro in search of water and of fresh grazing pastures for their flocks. Here was an expression of individual initiative, and from this activity sprang many of the cultural advances in areas in which sheep breeding flourished. Here, also, was the starting point of commerce.

The time when prehistoric man discarded animal pelts in favor of garments made from wool fiber is unknown, but whenever it was, it marks the origin of the textile industry. Wool in a felted state was probably the oldest fiber known to man, and its use developed in all parts of Asia, but notably in Mesopotamia and the Caucasus. It is quite probable that man learned of the potentiality of wool fiber quite apart from the animal skin itself, for an interesting ancient folk-tale concerns a nomad shepherd lad who twisted together stray lengths of wool fiber to bind a bundle of firewood. Some textile historians cite this incident as forming what we call yarn, by extending short wool fibers.

When man progressed from a nomadic life to more permanent habits of living, the new program called for improved contributions to both health and comfort, and man slowly acquired considerable ingenuity in supplying them. Time and time again, during the past twenty-five thousand years, he has altered his mode of community life. Former habits have disappeared just as have ancient cities like Troy and

Palmyra, but from their relics we are able to reconstruct ancient activities. The earliest historical civilizations appeared in Egypt and Asia and were further advanced by Greece and Rome. As civilization progressed from East to West, Egypt and the Near East became of less importance than did sea-minded people like the Phoenicians, Greeks and Romans who, in turn, helped to civilize the northern and western tribes of Europe.

The discovery of cloth, or, more specifically, the discovery of potential fibers which could be made into usable fabrics, is so closely related to the history of wool that the story of one is almost synonymous with that of the other. Fabrication of cloth did not advance along a road of easy progress, for it passed through much experiment in widely separated parts of the world. The first actually manufactured fabrics used for clothing were probably derived from the bark of trees, which was soaked in water, dried in the sun, beaten with sticks to promote felting and then interlaced to resemble cloth. Long before the emergence of what is called historic civilization, many primitive people had solved the rudiments of making rough cloth, and, wherever traces of ancient man have been discovered, there have been found traces of his efforts to spin and weave various fibers into cloth. Only in the preparation and use of various plants and animals for food has man gained greater mastery over nature in seeking to supply his needs.

# SHEEP AND THEIR ANCESTORS

SHEEP, to which Linnaeus gave the name Ovis aries, belong to the order Ruminantia, class Oridae, and are an important link in the long chain of textile history. This history of sheep is closely linked with the history of man, for men and sheep have been associated for about twenty thousand years. Whether some form of wild sheep pre-dated man or if primitive man existed prior to the advent of sheep is a question that has never been satisfactorily answered.

Sheep, as we know them today, are a development of several thousands of years and are evidence of the progress in animal husbandry which spread from Central Asia to Europe and ultimately throughout the world, for sheep raising was one of man's earliest occupations. He has appreciated the economic value of sheep more than that of any other animal. Perhaps the fleece of no other animal is as capable of improvement as that of sheep, and this may be the reason why it was early selected as the object of culture.

The origin of sheep as a genus is lost in antiquity, and practically all that is known is that, geologically speaking, the sheep group appear to be a comparatively modern form of animal life. Apparently they do not date farther back than the early Pleistocene, or the latter part of the Pliocene, because no remains, which can, with scientific certainty, be classed as those of the family Ovis, have been found in deposits of the tertiary or latest geological epoch, although such deposits have yielded modified forms of both deer and antelope.

Little is known with any certainty about the origin of domesticated sheep. Great diversity of views has prevailed among naturalists concerning their ancestors, but all admit that sheep are essentially an Old World animal group that have always shunned forests and feed either by grazing or by nibbling roots and shoots.

A summary of findings was prepared by Charles Darwin who sought to show that tame sheep came from no less than ten distinct, but remote, species of wild sheep. Other naturalists have limited these ancient ancestors to not more than two or three, for they detected an inclination of sheep to exhibit pronounced clannishness when promiscuously mixed in large flocks. This characteristic formed a natural barrier to extensive cross-breeding, for sheep of one particular breed, under normal conditions of existence, have always preferred to be surrounded with their own kind rather than with any other breed in even the same flock.

It is now believed that sheep were domesticated by primitive people even more ancient than the aborigines who first roamed the plains and deserts of Central Asia, and that only dogs preceded sheep in the animal-domestication program of ancient man. For many thousands of years, primitive man raised sheep solely for food, and, until slaughtered, sheep also provided a limited amount of milk, an important nourishment for all pastoral people. However, ultimately, primitive man learned to use matted or felted fiber for a variety of domestic purposes. It was easy for these ancient people to capture sheep for, even in those early times, laniferous animals were probably widely diffused over the central and western areas of Asia, and it is possible that most, if not all, of the sheep-keeping tribes of that great area acquired sheep from neighboring regions. The history of animal husbandry, although almost always specific, is in this instance insufficiently explicit to enable modern researchers to even surmise the time when these animals were first introduced, nor can we accurately trace the first stages of their development into modern sheep.

Present-day distribution of wild sheep, however, confirms the Asiatic origin of domesticated sheep, for even today large, majestic, wild sheep find a habitat in the immense mountain ranges of Central Asia, the Pamirs, and the rugged foothills of Turkestan. It is also probable that sheep of this type made their way over the Bering Straits into North America where they gradually roamed as far south as Mexico.

Early Oriental writers assumed a legendary wild ancestor that roamed the high plateaus of Central Asia and the lower hills of Turkestan which bordered the Caspian Sea, for sheep in a wild state are essentially mountain animals. However, when domesticated, they prefer a more open country and do not, as a rule, frequent such rugged terrain as do their near relatives, the goats. We are, however, on firm ground when stating that all the various types of European sheep came directly from an original stock of domesticated sheep.

However, many scientists agree that either the Ovis ammon, the argali of the Asiatic mountain ranges, or the Ovis musman, or mouflon of North Africa and Southeastern Europe, contributed to the bloodstream of at least a "middle-distance" ancestor from which modern sheep developed, but the probability has been slightly lessened by discovery of sheep remains mingled with stone weapons used by a people who lived under semi-civilized conditions.

The argali or Ovis ammon, the wild sheep of the Mongols, one of the giants of the Ovine family, roamed over Central and Western Asia and was known to the Egyptians.

The word "Ammon" was derived from Egyptian frescoes of the sheep-headed god Ammon who was depicted with the same type of outward-pointed horns as those which characterized the argali. These ancient sheep were agile and strong but were also shy and timid, in which characteristic they resembled their domesticated descendants. Many argali grew to be as large as an average-sized ox, being over four feet high at the shoulders and proportionately stout. The general color of its hairy summer coat was a light, speckled brown. Beneath this was a coat of short, fine, gray wool. In winter when the coat grew much longer, a pure white ruff made its appearance on the chest and throat. These sheep are believed to have originated in Central Asia, not far from the famous Tepe Gawra or Great Mound.

A modern member of the argali family, and perhaps the largest and most magnificent of all wild sheep, is the famous Pamir argali, or Ovis poli, which lives on "the roof of the world," as the Pamir Mountains are called. It was first seen by a European when, in the 13th century, Marco Polo, a Venetian trader and traveler, discovered and described it. Another modern member of the argali family is the Ovis Montana or Big Horn sheep of the Rocky Mountains, which is even larger and stronger than the average member of this group. They are not so large as the ancient argali, or Ovis ammon, were. They too are shy and suspicious of sound and shadow and, at the slightest alarm, will, like the Ovis poli of Asia, seek refuge in recesses of mountains.

Closely related to these two argali types, but a curious intermediate between sheep and goats, is the aoudad, a remarkable sheep-like animal, most often found in the Atlas Mountains of North Africa. Its fleece is reddish brown, and a distinguishing mark of this unusual animal is a strand of long hair hanging from the front of its neck.

Another argali descendant, which is also a surviving link between sheep and goat, is the aberrant, bharal or blue sheep of the Himalaya Mountains of Tibet. These animals are true denizens of the mountains and are never found below an altitude of ten thousand feet. Adult bharal sheep have a black band, mark of goat ancestry, dividing an upper fawn-colored and under white fleece, marks of sheep ancestry. They are found in herds of from eight to fifty. A peculiarity of the bharal is that males and females graze in separate flocks during the summer months but associate at all other seasons. Although easily domesticated, the bharal has never been known to breed with tame sheep.

Allied to more remote descendants of the argali is the Bokhara or Astrakhan sheep, the Persian variety of which is actually the dumba-wala of India. This ancient type of animal had been improved in Persia, as refinement of wool had, for centuries, been the aim of Persian wool merchants. The color of its fleece is variable, ranging from a uniform white, through grayish and yellowish whites, to rufous brown. Lambs of this breed are covered with a coat of fine, short, silky hair arranged in curly locks and yield a variety of astrakhan known as Persian lamb.

The mouflon or Ovis musman, so named by the French scientist Buffon, is an animal which, except for the wilder sections of the Near East, is probably extinct. It bore so great a resemblance to early types of domesticated sheep that it is looked upon as more than a "middle-distance" ancestor of modern sheep. The mouflon, too, was almost certainly of Asiatic origin, and there is a remote possibility that prehistoric inhabitants of Europe tamed the wild mouflon which they found in the Caucasus Mountains during westward migrations. This type of wild sheep was nocturnal in its habits and, like the argali, was timid. In fact, it was so shy that, as regions became even sparsely settled, flocks of mouflon retreated to a wilderness of almost barren rocks where they fed and rested. They were smaller than the argali and had horns that pointed inward, instead of outward, as did argali horns. They traveled in flocks of from fifty to one hundred, led by the oldest ram.

The fleece of this ancient animal, according to Dr. Anderson in his "Account of Sheep Found in the Russian Empire," was very short and coarse, more like hair than wool. Some authorities believe that, in summer, the fleece of the mouflon consisted of short, brown hair resembling that of the deer and that, in winter, it was a wool-like down, mingled with hair, about one and one-half inches long. At its base it concealed a fine, woolly down of light color. Authorities have variously described it as being nut brown or "ferruginous" gray. It is quite possible that this widely distributed sheep was reported in a variety of shades in the various localities in which 18th century experts studied their history.

Although too remote for authentic history, it seems possible that the breed of sheep that had been developed in Asia was brought to Europe in the Neolithic Era by ancestors of the prehistoric Lake dwellers, or Pfahlbauten, whose descendants are believed to have migrated with their sheep to Northern Italy. It is quite likely that this particular species may be extinct but that it was remotely related to the later mouflon which found grazing ground on the islands of Corsica and Sardinia. A more certain appearance of the mouflon in Europe was by way of Greece where, as recorded by early historians and poets, it was highly prized. After Rome was founded, it was probably brought to Italy by Greek colonists on the eastern coasts, and from there, a modified form of mouflon ultimately spread to ancient Iberia, Gaul and Britain. They were especially at home in mountainous Corsica and Sardinia, and on the islands of Greece. A modern sub-variety of the ancient and almost extinct mouflon is the Nemorhedinoe or goat-like antelope, of which the American Rocky Mountain goat is a member. These animals have short, woolly underfur and an outer cover of long, pendant hair.

It seems probable that the mating of the mouflon, or wild sheep of Southeastern Europe, and some members of the family of Asiatic Ural sheep formed not only the main but perhaps the sole type of sheep at that remote era of unscientific breeding. If this is true, it was also the parent stock of all domesticated European sheep. It is thought that this type of sheep was common in the Nile Delta areas of pre-Pharaonic Egypt. It was a long-legged animal which was often mummified, and pictures of it are found on some of the earlier Egyptian monuments. They were called the "Mendes sheep" of the era of Memphis and were the domestic sheep of the Neolithic Age in Egypt. This peculiar type of sheep survived until Semitic tribes of the north seized the Nile Delta as grazing lands for their superior breed of sheep.

It would be extremely interesting if we could, with any accuracy, trace the species of wild sheep that was the ancestor of domesticated sheep, but some of the more ancient breeds of semi-tamed sheep have become extinct without leaving more than a trace of their bloodstream in present-day standardized flocks. Other older breeds have undergone so many changes, especially during the past five hundred years, that any intermediate stock is practically unrecognizable, for sheep, more than any other animal, are capable of improvement. Since their long association with man, marked improvement in an originally ungainly body and in the characteristically coarse hair of wild sheep has been accomplished.

Unlike the dog and horse, sheep have never been individually trained because it was early learned that they gave no individual loyalty to a master. Sheep were "flock animals," but even as flocks they were helpless, and long before the history of sheep was recorded, they depended almost entirely for subsistence upon the care of man and were seldom found at any great distance from human habitation. Even today in rural areas, if a sheep wanders off by itself, it has little chance of escaping various forms of enemies, for it not only becomes potential prey of marauding animals but is peculiarly subject to disease due to a lack of the regulation to which it is accustomed. It is also the victim of insects which infest its fleece and are nourished by its blood and in this way undermine its health.

As may be expected, the root word for sheep is of ancient origin, but it is not so easy to suspect that this root word reflects the knowledge of ancient Mesopotamians of the characteristic helplessness of sheep. As we use it in our language, the word is of old Saxon origin, but in this form it worked its way from the Sanskrit word "avi," a modification of an even older word "av," which means "to guard." Thus the word "sheep" means an animal that requires careful tending and guarding and suggests that even in those far-away days of primitive nomads it was known that, in contrast to goats and cattle which could largely shift for themselves, sheep depended upon man for their very existence. The story of the watchful care given by ancient shepherds, who for centuries wandered about a wide area to seek pasturage for their flocks, has been handed down to us in songs, legends and poems of romantic beauty, which reached spiritual heights in the Biblical "Agnus Dei"—Lamb of God.

Very early in the association of men and sheep special names were used in order to identify the various species. Although the words in use today are fairly modern, they stem from ancient etymological roots. The adult male sheep is called a ram. This word is derived from the Greek word rami, meaning a battling animal of strength. The adult female sheep is called a ewe, directly from an old Teuton word awis, but originally from ovis, the Latin word for sheep. The word for young sheep is lamb which is a modern corruption of the Greek word anmos from which the Latin word agnus is again corrupted into the Welsh word llam which means to skip and frisk. This word is akin to the Hindu word lela and Persian word lani, both of which come from the Sanskrit word lal which means roving and sporting.

When, during early phases of civilization, sheep were taken from one country to another for grazing, they eventually provided products for barter and were exchanged for other commodities in settled communities near which they passed. Varied conditions of climate and changes of fodder slowly produced new types of sheep. No other animal has exhibited equal ability to adapt itself to local conditions and to be so much influenced by environments. Sheep ultimately became indigenous to almost every part of the world except frozen regions. Most animals require rich and plentiful food, but sheep have always shown a tendency to a bare living. Scanty grass and common roots of dry, upland pastures, often at altitudes where other animals could not find nourishment, usually have provided sufficient forage. Contrary to a general impression, the scantiness of its food enhances the value of both the fleece and flesh of the sheep.

Although existing for many centuries under crude conditions, sheep from the earliest times have been highly prized by their owners, and in return they have yielded a usefulness that has not been exceeded by that of any other animal. Sheep raising was one of the first activities of man, and domesticated sheep appear in authentic records as early as 4200 B.C. Relics of them have been found in the Tel Asman or Great Hill on the banks of the Euphrates River in Mesopotamia. The earliest known representation of sheep is in a mosaic of Ur not far from the Persian Gulf and dated about 3500 B.C. It shows sheep of Sumer being offered as a tribute. This place may have been one of the important centers from which an early form of domesticated sheep spread across Central Asia and eastward to Siberia and Mongolia without penetrating China. Those ancient Sumerian and Chaldean tribes of that mysterious land and their successors were traditionally nomads, and for thousands of years, wandering shepherds of Mesopotamia, Syria and Scythia, in seeking pasturage for their flocks, maintained the distinctive pastoral characteristics of their native countries. Here, so far as is known, occurred the greatest development in agrarian life, for as these various pastoral tribes spread out over the continent of Asia and along the northern coast of Africa, they brought sheep, their only tangible property, with them. They increased their flocks by breeding and cross-breeding, improving the quality of meat and ultimately perfecting the wool to a degree of making recurrence of the original hairy coating less frequent.

# THE MERINO SHEEP

MERINO sheep have played an important part not only in the centuries-old history of wool but also in the development of weaving and dyeing, for they have been successfully acclimated to almost every country in the world and are more or less represented in prominent sheep breeds of the present day.

The pure merino sheep, which for countless centuries of carefully selected breeding has been developed essentially for its fleece, undoubtedly yields the finest quality of wool. It fattens very poorly and, whenever necessary, is able to exist on very scanty pasturage during dry seasons. In fact, this breed thrives best where the climate is dry, for if they are raised in moist areas on richer pasturage, their wool is coarse and is not the fine fleece which often develops under feeding conditions that would almost mean starvation for sheep of other breeds. Merino sheep became the lords of the land in Spain until over-restricting legislation ruined the prosperous industry and shifted the raising of this type of sheep to France, Austria, and ultimately to America and Australia.

The history of merino sheep is the saga of the merging of an ancient native breed with an immigrant cross-breed stock that had required nearly three thousand years to travel from the plains of Syria to the shores of the Western Mediterranean coast. Each breed contributed its peculiar characteristic to the merino sheep we know today.

Opinions differ as to the remote origin of the native Spanish stock, but there is little doubt that, through the centuries, a number of different types of fine-wool sheep was brought to the Iberian peninsula from Asia, Greece and Rome, and that these various blood lines ultimately fused into a distinctive Spanish type, an ancestor of the merino sheep of today. From statements in ancient records, there appears to be historical evidence that sheep of a similar breed were imported into Spain from Carthage in the days of her ancient glory, for we know that even prior to Roman times there existed a breed of sheep that had "short, crimpy wool" and lived in lands bordering on the Spanish shores of the Mediterranean Sea. However, the legendary wool of Taurida, in Spain, is supposed to have been derived from early Greek stock, but how they reached Spain, if not through Carthage, is problematical. This type of sheep is believed to have been a form of Syrian sheep known to Eastern shepherds as Imri and to have originally been brought to Spain by the Phoenicians who had established a great warehouse-distributing center at Carthage centuries before Rome was founded. From this ancient port a knowledge of sheep husbandry spread over Southern and Western Mediterranean coastal areas. One of these auxiliary ports was in Spain which was one of Phoenicia's richest trading centers, and at Cadiz they converted raw wool into cloth preparatory to dyeing with their famed Tyrian purple dye.

When, centuries later, the Roman army occupied Spain, it undoubtedly found this type of sheep widely dispersed on the Iberian peninsula, and prior to any civilian activities by the Romans, they are believed to have ordered the native Goths to immediately provide the occupying forces with the light-reddish wool then common to sheep of Spain. It was this type of sheep that was the ancestor of the later "transhumante," and which, according to Spanish historians of the Middle Ages, beat down paths through the mountains that were used by Hannibal on his march to Rome.

When the Roman civil administration became active in Spain, it greatly improved the native stock by cross-breeding with Tarentine sheep which during the 1st century had been brought from Italy for that purpose, for the uplands of Spain could not boast of fine fleece until that country had absorbed breeding practices of Italy and the Near East. After the Romans departed, nothing noteworthy occurred in Spanish sheep breeding until the conquest of Spain by the Arabs in the 8th century.

Between the Roman occupation and the arrival of the Arabs, it is believed that the indolent Spanish natives neglected their flocks, which for want of proper care in time deteriorated into so-called "churra" or common sheep of Spain, which did not yield the type of wool required for weaving into cloth. This wool, when called for by the upper classes, was imported from the Near East. For a long time, however, the churra was looked upon as the original breed of Spanish sheep. It was a hardy type of animal that could forage for food under difficult conditions and was able to go without water for long periods of time. Although its body was small, and its fleece was too coarse for any other textile purpose than felting, yet its meat was palatable, and this made it the type of sheep most typical of Spanish husbandry at the time the Saracens or "Eastern people" arrived. It is believed that literally millions of these sheep roamed the central plains and mountains of Spain at that time.

Sheep-wise Arabs introduced their superior breed of sheep almost as soon as they arrived on the coasts of Southern Spain in 711 A.D. Without delay, they reestablished and even improved both types of sheep, and it is believed that an ancestor closely resembling a merino type of sheep was developed in this way by one of the invading tribes called Berbers, or Beni-Merina, of North Africa, who, having recently been converted to Mohammedanism, joined their Arab coreligionists and helped conquer Christian Spain. These invading tribesmen, described as Moors, Berbers and Saracens, were traditionally pastoral, and when they learned of methods to lighten the color of fleece, they gave the project speedy reception, offering but few obstacles to the program.

Alteration in the color of wool evidently closely followed the line of richest soil for growing pasturage, and it spread more quickly in countries where people, like the Arabs, had made animal husbandry an ancestral activity and had long known that soil had much to do with color of wool. They soon learned that sheep fed on rich grasslands usually produced white wool and that this was one reason why the ancient Hebrew shepherds ceaselessly roamed the "fertile crescent" in search of fresh grazing land. Those old patriarchs had learned that, while sheep could exist on scanty forage grown on sandy soil, their wool under these circumstances was more or less brown, or even a bright yellow which was common in Middle Egypt and India.

It is noteworthy that even in those ancient days, when it was possible to obtain a light-colored fleece, the tastes of people seem to have responded favorably. Otherwise, fleece color would soon have reverted to its original dark-brown shade which, throughout the history of sheep husbandry, it has shown a tendency to do.

It is quite probable that, in their long hegira from Syria and Arabia, the Arabs left Egypt and, following a logical path for forage along the northern coast of Africa, finally arrived in Spain, bringing with them a fairly highly developed type of sheep which had historical origins in Asia, but, as a result of promiscuous mingling with other and more sturdy types of sheep along the route, developed into a distinctive type. It has long been thought that these ancient sheep provided wool of such fine texture because of the practice of moving them from one pasturage to another, a custom which the Arabs retained after their arrival in Spain. The word "merino" comes from the Sanskrit and means moving from one feeding ground to another. During their development, the merino sheep pastured on three continents in the course of three thousand years.

These migratory sheep were bred with such remnants of the Roman-bred type of sheep as were found roaming in Spain from Gibraltar to beyond the French borders. This Iberian adventure in sheep husbandry on the uplands of Spain is believed to have produced the ancestors of all true merino sheep, with their almost pure white, curly fleece that was to make them so world-renowned and become an important source of revenue not only for the Arabs, but also for the Spanish Crown. So slowly, however, did the fleece color change that it required over eighteen hundred years to spread from Syrian valleys along the southern coasts of the Mediterranean Sea and ultimately come to rest with the nomadic shepherds, who accompanied the Arab invaders of Spain. This cross-breeding constituted one of the most astonishing alterations of wool characteristics in the history of animal husbandry. In their perfected form, merino sheep were not indigenous to the Iberian peninsula, and no mention of this type appears in Spanish records prior to the advent of the Arabs. From this time on, however, churro sheep of Spain were ignored, except for food, and were not again important until taken to Mexico in 1540 by the Spanish Conquistadores.

After the Arabs had been driven out of Spain by Ferdinand and Isabella, merino sheep were even more carefully developed, and rams from North Africa were imported to improve the still numerous churro stock. Until the 18th century, fleece from the merino sheep made Spanish wool merchants wealthy, because strict laws prohibited exportations of merino sheep from Spain, and European cloth merchants were forced to pay any price for wool that the Spanish wool dealers demanded.

It was in Castile that the medieval Spanish wool industry had its start, but regardless of the place of origin, these sheep found favorable climatic conditions in the Spanish uplands, for there it was possible to bring out characteristics that differed considerably from other finely bred sheep of Europe, the main development taking place from about 1400 to about 1700.

Merino sheep long had an undisputed right to roam all over Spain. This hereditary right was not entirely of Spanish origin. It had been practiced earlier in Italy and North Africa and had been introduced into Spain by the Arabs, who carefully developed these migratory or periodic habits which reached their peak in the 13th century, when hundreds of miles of well defined paths, called "canadas reals," could be traced throughout Spain.

As Spanish flocks grew in importance and numbers, it became apparent that these migrations did irreparable damage to the lands over which immense flocks traveled. Farmers and landed proprietors along the seasonal routes to and from the mountains suffered considerable damage as a result of trespassing. However, the "right of pasturage" had been accepted from time immemorial and could not legally be interfered with; for during the Middle Ages these vast flocks represented no small part of Spanish wealth. In 1273, owners of these sheep formed an association, or mesta, under the patronage of Alfonso of Castile, in order to regulate pasturage. This tribunal immediately insisted upon the hereditary rights of its members to graze sheep on all open or common lands, but regulations were proposed to govern migrations. Among them was one which prevented sheep from mingling with inferior breeds of local sheep, which were probably the ancient churra. No shepherd was permitted to lead his flocks "across orchards, grain fields, vineyards, cow pastures or mown meadows." Shepherds were ordered to cross only fallow fields, for it was very early known that merino sheep could find food even in a poor grazing area.

The longest "canada real" was a to-and-fro journey about four hundred miles long, which could normally be accomplished each way in about six weeks. Thus, about one-quarter of each year was passed in exercise and freedom with each day's travel closely scheduled. When passing through cultivated lands, the normal daily speed was between eighteen and twenty miles, but when in open grazing country that offered good pasturage, flocks proceeded leisurely, generally at a speed of barely six miles each day.

Spanish merino sheep were anciently classified either as estantes, i.e., stationary, or transhumantes, i.e., migratory. The former remained in fixed pasturage and were not put out to graze until April, whereas the latter were the hardy species that remained in the open all the year with the result that this particular type developed an especially fine quality of wool. Every spring, under guidance, they were driven in search of mountain pasturage, usually passing the summer on the slopes of the Pyrenees Mountains and, in the autumn, returning to the balmy plains of southern Spain. Flocks of transhumante sheep, often numbering more than ten million, were broken up into smaller units of from ten to forty thousand animals, each group being under the care of a "mayoral" or chief shepherd, who operated with approximately fifty assistants and twice as many trained dogs. These assistants, in turn, were broken up into five groups who were paid wages commensurate with their work and responsibilities.

For centuries, Spanish merino sheep produced the finest wool in the world. One of its great values was the crop-weight of fleece, which averaged eight pounds per animal for rams and five pounds per animal for ewes. This increase was attained by Pedro IV of Castile, who renewed the Spanish type of sheep by again breeding them with rams raised on the Barbary Coast of Africa.

So jealous were Spanish wool growers of their favorable position as suppliers of the world's best fleece that, quite early in its development, laws were enacted which prohibited exportation of these sheep from Spain. However, during the 18th century various European countries smuggled, or otherwise contrived to obtain Spanish-bred merino sheep and, often with excellent results, cross-bred them with native types. From this source came the Rambouillet sheep of France and the Silesian sheep of Saxony, both famous for their fleece.

It has been rumored that in the reign of Henry VIII about three thousand merino sheep were brought to England for the purpose of cross-breeding them with the less desirable native stock, but that little headway was made. It is also said that Queen Mary of England, wife of Philip II of Spain, also imported Spanish merino sheep for the same purpose and with the same results. It was largely due to interest on the part of George III that some merino sheep appeared in England about 1787, but it was said that these sheep were not of the best Spanish breed, and husbandmen "were of the opinion that they would neither acclimatize nor cross." This may have been the trouble with previous importations. However, in 1791 a better breed was obtained, because the king quite subtly presented four cream-colored horses to the Spanish ambassador with a suggestion that a few pure-blooded merino sheep would look well on the royal pasture. These animals were resold to sheep raisers at enormous profit to the royal pocket. In 1811, a Merino Society was formed in England and its activities must have been tremendous because fifty-four vice-presidents are listed for the first year.

Since 1810 another important merino cross-breed has been developed in Australia, where 75% of wool exports is the Botany type of fleece. The name comes from an early colonial settlement and is synonymous with merino. In fact, a majority of the fine-wooled flocks of the world have either directly or indirectly been derived from the merino type of sheep, which for centuries has been famous for the quality of its wool.

Many important varieties of cross-breeding developed in England where, at one time, there were over two hundred important breeds of sheep, each type differing from the other in appearance, height, weight, structure or texture of fleece. Approximately thirty improved breeds of sheep, developed in different parts of the world, now provide standard types of wool for all purposes. In its strictest sense, the term "cross-breed" is applicable only to sheep which have been evolved by crossing one breed with another with a view to developing a single desired characteristic, but most of the genuinely cross-bred wools come from dual-purpose sheep which, in turn, are the result of crosses between the merino and one or another of the English breeds.

Originally, cross-breeding may have been used to improve the quality of the wool produced by a sheep that already was a good mutton animal and to secure a wool that, in fineness and length of staple and even increased weight of fleece, was superior to that previously yielded. By further cross-breeding, the future type could be reverted in the direction of either of its original parents, thereby providing a wide range of cross-breeding possibilities. Quite often, breeding was directed to increase resistance to certain local climatic conditions.

Some historians believe that, about the same time as, or even prior to, the arrival of the Arabs in Spain in the 8th century, other migrating Asiatic tribes crossed the plains of Central Europe, taking with them a similar type of Eastern-bred sheep. It is suggested that these nomadic people and their sheep ultimately reached England, and it is possible that the typical sheep breeds of England have been developed from this ancient stock. Other authorities incline to the belief that decendants of this original stock were taken from England to Spain and were called merino, because "ultra marinus" indicated that their ancestors came from some place "beyond the sea." This is an ingenious and interesting, but very unlikely, theory.

There is also the tradition in England that merino sheep were native to England, and that some of these sheep were taken to Spain early in the 15th century, and contributed to the development of the merino type in that country. This story, however, carries no weight when it is recalled that, even prior to the Roman occupation of Britain, Spain enjoyed the reputation of producing fine wool. So when we read that, in 1399, John of Gaunt of England sent a number of sheep to Spain as part of the dowry of his daughter, we should look upon the incident simply as a form of royal courtesy, rather than the introduction of a new breed of sheep into Spain.

In the reign of Henry VI, 1422 to 1461, the English Parliament zealously endeavored to preserve the breed of English sheep by prohibiting exportation of live animals. However in 1466, his successor, Edward IV, in order to cement alliance with King Henry of Castile and King John of Aragon, "improvidently granted license for certain sheepe to be transported into the country of Spaine." These prize sheep of that day would be scorned by modern breeders, for records state that they "produced about one pound of wool, and often less."

The distinctive Cheviot sheep, named for their original home in the Cheviot Hills in Northern England on the border of Scotland, are thought to have originated in England, when, during the attempted invasion by the Spanish Armada in 1588, several enemy vessels were wrecked, and many Spanish sheep, carried by the fleet for food, succeeded in swimming ashore. They reached grazing grounds in the Cheviot Hills, where, because of their fine wool, they have been bred ever since.

## ALTERATION OF FLEECE

SHEEP were originally domesticated solely for food, and primitive sheep were most likely covered with long, stiff hair. Even today, sheep, as mountain animals, will atavistically grow hair instead of wool when they are old, or if they are neglected for any length of time. In those early days, their wool, which is now prominent, was merely a downy undercoat, but with the passage of time, hairy flocks were out-bred and were gradually succeeded by sheep which yielded true wool. As domestication proceeded, a fleecy, soft wool became a fixed characteristic.

The covering of primitive wild sheep consisted of an outer coat of long, coarse, heavy hair and a meagre, soft, fine, downy undercoat valued for its warmth. There was considerable variation of the outer hair and, to a somewhat less extent, of the underfleece. Such a wide range of hair and wool was unsuited to cloth making, and even the primitive nomadic tribes of Western Asia sought to improve its quality. By selective breeding those early shepherds endeavored not only to completely eliminate the outer coat of hair, but also to develop breeds in which, throughout the entire fleece, the quality of wool was as uniform as possible. Even in modern times, however, relics of the original hairy outer coat appear in the form of coarse bristles that cover head and legs, and in an occasional stray fiber or kemps scattered throughout the fleece. The hairy birth-coat on lambs of many breeds is considered to be a relic of the past.

Living in a wild state on mountains or foothills but feeding in the open where, in clear weather they are exposed to sunlight and therefore are the prey of enemies, sheep are provided by nature with a protective covering which is best suited to their habits. With the exception of the all-white Alaska Big Horn, whose habitat is among snow and glaciers, all wild sheep have an upper coat of wool much darker than the fleece on the underside, which is almost always white. Primitive sheep of Siberia and Mongolia invariably were a grayish brown, and when dyes became known, it was learned that their fleece could be dyed only in still darker shades. Undoubtedly, these dark outer coats were designed by nature to render sheep as inconspicuous as possible, and it is noteworthy that this protective coloring, useless for domesticated sheep, had largely disappeared even prior to scientific breeding for light-color wool.

From evidence dating from a very early period, we have proof of the importance attached to breeding for light-shade fleece. Biblical narratives from Exodus to the end of the Old Testament and other ancient sources refer to this endeavor and to its importance to wool buyers and cloth weavers. In glowing terms, classical writers tell of wool from Miletus; Hebrews clamor for the white wool of Damascus; Isaiah, the Syrian translator, records the promise of Jehovah "though your sins be as crimson they shall be as white as wool"; and in Syria and Persia, the influence of these ancient shepherds is still visible in the quality of their fleece. The Libyans were reported as "abounding in flocks of whitened wool," and fleeces are still produced in that area that are not unworthy of scientific husbandry. The Coraxi near the Euxine (Black) Sea "were skilled in handling white and golden wool from which they made carpets and shawls."

From legends of nomadic tribes and from hints given by early writers, it would seem that sheep wool of the Orient was originally black, or at least very nearly so, and that altering its color to a light brown or to gray took place very gradually. The lessons of early Semitic shepherds of about five thousand years ago seem to have been the first steps toward obtaining wool of the color and quality known today.

The flocks of Laban, the Syrian, are the oldest for which we have authentic and specific record. The fleece of his flocks, as well as that of most other Oriental flocks of that day, was so deep a shade of brown as to have been almost black. His head shepherd and future son-in-law, Jacob, was, in his day, probably the most scientific of Oriental breeders. By his presumably original experiments in animal husbandry, he not only multiplied the flocks of Laban, with some advantage to himself, but was familiar with a breeding technique that would perpetuate any accidental variety which might develop. It is a part of the legend of sheep breeding that Jacob, whose paternal grandfather had been a wealthy sheep owner in the Chaldean hills and valleys, was shrewd enough to realize that the early Oriental practice of breeding sheep with their near cousins, goats, helped to perpetuate a dark-brown or even black fleece, and it was therefore ordered that sheep be separated from goats. It was quite logical, however, that this inter-breeding should have been practiced, for sheep and goats had nearly equal value, and prior to the use of wool for cloth, if there was any dietetic preference, it was undoubtedly in favor of goats because of the large volume of milk that they yielded. The wise decision to separate these animals seemed more logical, however, when it was explained to those deeply religious people that sheep, especially when lambs, were endowed with a quality of purity and innocence which, even today, is found in religious symbolism, while the guiltless but unlucky goat bore the stigma of stupidity and evil. From this Jacobean period we hear much less of the goat than in preceding ages.

Not for centuries did the Syrian and Mesopotamian "breeding for wool" principle of sheep husbandry pass beyond the plains and valleys of the Near East, but when it did so, it traveled in two different directions, one of which followed the Euphrates in a northerly direction reaching the banks of the Phaois river and spread through the ancient kingdom of Colchis from which region it undoubtedly passed to Greece and ultimately to Southern and Western Europe.

Colchian, or Circassian, sheep and the wonderful Syrian breed called "Imri," which some etymologists suggest is the root word of "merino," are believed to be descendants of ancient Arabian sheep so well known in their original form to the ancient Hebrew patriarch-shepherds. Because of their long, fine, silky wool of silvery white, tinged with a slight bluish sheen, they are bred even today in the Asiatic-Russian province of Mingrelia. They are essentially mountain-bred, and their lambs are preserved as such to an older age than would otherwise be possible by daily dampening and pressing of the locks of wool against the animal's body. Preserving the lambs in this way results in larger skins. These adult sheep yield an Astrakhan fur, known as Ukranian lamb, and are often black with an occasional white spot.

Colchis was famous for the legendary voyage of Jason, Prince of Thessaly, who led the Argonauts in quest of the Golden Fleece. This was looked upon as a treasure of sufficient value to become the objective of a voyage in the Argo to the country of the fierce and often savage Colchians. Their adventure was deemed of sufficient merit to incorporate it in the songs of Orpheus and, at a later date, was used by a succession of local Greek poets to symbolize and commemorate an important pastoral event in a nation of warriors and explorers. The epic poem "Argonautica" by Apollonius Rhodius written about 194 B.C. tells the story of a band of heroes called Argonauts who sailed with Jason on his successful exploit to win the Golden Fleece of Chrysomallus, the winged ram. Even at that time it was an old story. Homer's "Odysseus" may have, in part, been founded upon the original. In ancient times, this adventure of Jason was regarded by many as a historical fact and as an actual maritime expedition at the very beginning of Greek commercial activity.

The so-called Golden Fleece may have been some form of woolen cape or gown in a form unknown to the less advanced Greeks because, even at that early date, the fleece of Colchian sheep was famous for its yellowish-golden tinge so common to white fleece before it is thoroughly washed. However, Colchians are known to have washed lambs daily in an effort to bleach the original black wool and to preserve the curly, silky quality of the fleece. Perhaps the intrepid adventurers failed to return from their first adventure with living sheep, for in those legendary days there were no channels for even a primitive commerce, so we do not know at what period alteration in color of fleece was inaugurated in Greece, but it may have started soon after Colchian sheep were brought to that country.

Another legend related that people who settled at Colchis in the mountains of the Caucasus washed their sheep in mountain streams which contained minute particles of gold which became meshed in the fleece of the sheep. Still another explanation is that Homer had learned from Greek mariners of an improved breed of sheep with exceptionally light-colored wool, which had been seen by early Greek traders in the trans-Caucasus area at the dawn of Greek history, and that a few of these sheep had later been brought to Greece to improve local flocks. Also, from those early voyages of Greek mariners to the shores of the Euxene Sea possibly originated the legend of the Golden Apple of Hesperides, which constituted the eleventh "Labor of Hercules." The "Golden Apple" is now believed to have been a melon, long native to the Colchian area. Marco Polo, who lived from 1254 to 1324, and was probably the most famed Venetian citizen, after spending many years in the Orient, voiced the opinion that the "Golden Fleece," which Jason had seen at Colchis, was "rich, golden-covered raw silk in the hank."

The fame of Greek fleece ultimately reached Rome, and that country became the second nation in Europe to import Colchian sheep which some authorities look upon as a remote ancestor of the modern merino sheep. When and where systematic efforts to improve fleece of sheep took place in Western Europe is not definitely known, but it came about very gradually in Southern Europe, one of the important areas of its development.

About 200 B.C., the Romans practiced scientific breeding, developing the Tarentine breed of sheep which is believed to have originated from the breeding of a rough, native, Italian breed, probably descended from sheep brought to Northern Italy by migrating Swiss Lake dwellers, with Colchian rams imported from Greece. These Colchian sheep, even in those remote days when sheep were not universally bred for fleece, were considered by contemporary authority to produce the best fleece in Europe. The Tarentine type of sheep had a long, heavy, but fine, staple wool. By introducing this type of sheep into the western Roman colony of Hispania, a breed of sheep was to be developed in the future that was to remain famous for centuries.

We now return for a moment to Asia Minor where grazed the best flocks of ancient times. We have seen how migration up the Euphrates brought some of these sheep to the Caucasus, and now we shall follow another migration, also in search of new grazing grounds, which traveled down the Euphrates and, passing over the even richer but unfriendly fields of Syria, finally reached the borders of the Nile. From here these flocks were leisurely led along the northern shores of Africa, and from the mating of sturdy rams from these North African flocks with ewes from the Roman-Colchian flocks, developed the most significant step in ancient sheep-breeding, for its objective was both superior wool and quality meat. Unfortunately, it was found impossible at that time to develop, on the soil of Italy, a distinctive breed of sheep which would provide both fine wool and good meat. In some instances, where the original Northern Italy stock was prominent, the wool was negligible in quantity and low in quality, but meat was fair. In other instances where North African influence predominated, the wool was excellent, but the meat was of little value. So the Romans decided to sacrifice the meat value of these sheep and to emphasize their wool value. This decision was of historic importance to the history of wool in Europe.

These early Roman cross-bred sheep were interchangeably called Tarantine, Apulian, when raised at Apulia on the Bay of Naples, and Atticus, which name may have suggested one of its Greek ancestors. Pliny, the Elder, who lost his life in 79 A.D. in the famous eruption of Vesuvius, declared that these sheep produced a fleece unequalled in his day, and Strabo informs us that "Spaniards formerly brought in many woolen garments to Rome, but now their wool is no better than that of the Coraxi (Colchian), and fabrics of extraordinary thinness can be made."

The ancient Romans bestowed extravagant care on their precious Tarentine sheep. It is a matter of record that, at Pallentia, from the hour of birth, sheep were protected from insects and climate by snug-fitting, skin "slip-ons," or other forms of protection, and to impart a waxy gloss to the fleece, it was daily moistened with oil, after it had been washed in water mixed with wine and then well combed to prevent matting. When these sheep reached two years of age they were killed, for it was believed that, at this age, their fleece was in its finest condition. With such care, it was possible to produce exquisite woolen cloth which found favor with Roman nobles and wealthy citizens until the appearance of luxurious silk fabrics from the Orient, after which there was little demand for even the finest woolen cloth. As a result of the dwindling market, Roman husbandmen neglected fleece, and these carefully bred sheep became more valuable for food. Pliny states that, in an effort to prevent their total extinction as a source of fine wool, a few Roman agriculturalists maintained fairly large flocks of Tarentine sheep in Dacia, north of the Danube River, and at Laodicae in Syria.

However, Tarentine sheep were also saved from total extinction as wool bearers by being sent to Spain for cross-breeding with native stock. Valuable information about this project comes from Lucius Junius Calumella, whose book "De Re Rustica" is the most accurate agricultural text that has come to us from antiquity. Although a Roman citizen, he lived at Cadiz, Spain, where he and his uncle, also a Roman citizen, possessed large estates at Cordoba. These were scientifically cultivated, and on their lands the imported sheep thrived remarkably well, for the topography and climate of Spain, being similar to North Africa, was peculiarly adapted to sheep raising. Calumella records that, in 50 A.D. during the reign of Emperor Claudius, he brought blooded Tarentine rams to Spain, and that this group was the first Italian-bred sheep to reach that country. He also imported selected rams from North Africa, and both types were successfully crossed with a native stock that had been developed in Spain. This multibreeding so improved the native stock that, by the fall of the Roman Empire, Spanish sheep had become a fixed type.

As a matter of fact, the original Tarantine sheep had fleece of a light brown color, but cross-breeding with local Spanish stock, which had fine fleece and were descendants of sheep thought to have been brought to Spain by the Phoenicians as early as 900 B.C., produced not only a lighter fleece, but also a more vigorous stock. It is believed that these sheep were the ancient progenitors of what later became the famous merino sheep, which for centuries were exclusively bred in Spain, and which, with later cross-breeding, became the ancestors of modern wool-growing sheep of Europe, America and Australia. Spain paid more attention to sheep breeding than did any other nation in ancient and almost modern times. By breeding various breeds of Asiatic, North African and European origins, each of which at its peak was the best known sheep of its day, the Spaniards ultimately developed merino sheep, the most valuable and most widely diffused of all fine-wool breeds of sheep.

# WOOL AND ITS ALLIES

In the broadest sense, the term "wool" includes the fleeces of several types of animals, but the greatest volume is derived from sheep of which there are four principal varieties: 1) argali, or wild sheep of Asia, 2) mountain, or maned sheep of Tibet and North America, 3) mouflon of Sardinia, Corsica and Greece, and 4) Ovis aries or domestic sheep. Of these, the production of wool is confined to the last group. The first three groups are of interest only to students of natural history.

We are so accustomed to look upon wool as the exclusive product of sheep that we often fail to realize that there are unusual breeds of sheep whose backs are as destitute of wool as are the deer or greyhound. However, even some of these sheep have short, thick, opaque hair which, like bristles on a hog, grows widely spaced, and others have a coarse but smoother coat as full of luster as a well-groomed horse. Sheep of this description are still found in Asia, and those of rougher coat are natives of North Africa, China and some parts of the East Indies.

At first, wool was a very coarse, hairy fiber, and even today it is commonly so in remote areas of China. Its development into soft fleece, so familiar on domesticated sheep, is a result of long, continued selective breeding, for in a neglected state, fleece of sheep contains less wool in proportion to hair, but under domestication hair has largely been displaced by wool.

Regardless of the type of animal from which it is obtained, any wool fiber, or modified hair, may be described as a compact system of irregular, roughly cylindrical spindle-shaped cells, tapered at the ends. These have been largely standardized by nature into three divisions:

1) An epidermis or "outer guard," consisting of scales which project out from the surface of the fiber, having flanges which protrude towards the tip and which overlap each other much like fish scales or tree bark, with the function of protecting the animal from snow, rain and friction by rubbing against objects in its path. Because of this peculiar quality, only pressure, moisture and heat are required to convert wool fiber into felt without either spinning or weaving, for these serrations move in one direction only. When the fiber is moist and warm the scales are more open, and they become entangled with other fibers to form a homogeneous mass called felt. So intense is this felting quality that often the entire fleece of an animal recently sheared will hold its original shape due to the interlocking of individual fibers. These hairs range from one thousand to four thousand per inch and give the fiber its cohesive properties. In a general way, the number of scales is related to the thickness of the fiber, being greater in fine wools, but there does not appear to be any direct connection between the scale formation and the luster of the fiber. Scales vary in type from those with straight edges to others which have marked wavy serrations, the former type being used for fine woolens and the latter for coarse woolen fabrics. Because of these serrations, wool has practically no luster.

2) The cortex, or second layer, which is underneath the epidermal scale. This consists of layer after layer of interlaced, compound cells which adhere closely to each other, and although they bend, swell, stretch and shrink, they seldom break apart. This is the important fiber, giving

strength and elasticity to the wool. It is also provided with intermediate cells that hold color pigments, these appearing to a lesser degree in the medulla but very rarely in the cuticle. The purpose of the cortex is mainly to conserve and regulate body heat.

3) The innermost layer, called medulla or pith, which consists of large, air-filled cells which are discernible only in coarse and medium-quality wools, as finer wools that have no medulla absorb dyes more readily. However, most wools dye evenly and well.

Wool usually grows in tufts of from one hundred to nearly three thousand per square inch, and although wool is considered to be the weakest of all major animal fibers, having a low tensile strength, yet it has a natural elasticity. When its diameter and light weight are considered, wool fiber can be classed as fairly strong, and although the breaking strain of wool fibers differs quite amazingly, this does not necessarily reflect upon the merit of the weaker types, for what they lack in strength is usually made up by some other quality. Of the various wools, mohair is the strongest, having a breaking strain of 536 grains for a single fiber.

The actual wool fiber grows in a wavy form, having a natural twist or crimp, and this crimp, together with the structure of the fiber, enables it to be stretched as much as 30%. When released from this tension, it will spring back to its original length. This resilience, which is retained during the long-wearing life of the fabric, is the reason why woolen garments resist wrinkles and do not crush. It also explains why woolen blankets do not mat down, lose their warmth-giving properties or become stiff or thin.

Due to porous structures, wool fibers are able to absorb as much as 18% of their own weight in moisture without even becoming damp and one-half of their weight in water without becoming saturated. This is a feature which no other natural or synthetic fiber possesses. This absorptive quality of wool has been known for many centuries, and even primitive man recognized wool as the most healthful of all fibers, because of its ability to absorb perspiration and yet not cling to the body.

The greatest volume of sheep wool is sheared from living animals, whereas a lesser quantity, although steadily increasing in volume due to refrigeration, is recovered from sheep that have been killed. Known as "skin" or pulled wool, it is removed from the carcass of slaughtered sheep either by the use of lime, by a process known as sweating, by a chemical depilatory, or simply by being pulled out. This wool is of inferior quality and lacks the firmness and elasticity of wool taken from living sheep.

On a basis of fineness the various sheep wools can be classed in three broad divisions: 1) merino wools that are fine and short and have an ability to absorb dye, 2) carpet wools that are coarse, long and lacking in quality, 3) crossbred wools of medium fineness and medium length. The modern natural color of wool is white, but various shades of black, brown, gray, bright yellow and even dull red, are sometimes found. Yellow wool is due solely to the nature of the sheep, whereas most other shades can be traced to soil, as it was early demonstrated that sheep which grazed on new, rich grass usually produced white wool.

Lamb's wool is the first fleece sheared from a lamb six to eight months old and is of superfine quality. The fibers are short, fine and tapered towards the tip. Because the ends have never been clipped, they are either rounded or pointed, a characteristic which results in fine yarns and a fabric of peculiar softness. In subsequent shearings fibers are roughly uniform in thickness, varying only in accordance with the animal's health and its reaction to weather and other variable conditions. In event of illness or neglect, thin and tender places develop in the wool grown during that period, and these seriously detract from its value. Fleece from sheep twelve to fourteen months old is called hogget wool and is also fine, soft and resilient. Subsequent clips called wether wool are the fleece from sheep older than fourteen months and are of slightly less value. The term "virgin wool" merely refers to wool direct from fleece as distinct from wool recovered from previously manufactured clothing.

No less than six or eight different qualities of wool are derived from present-day sheep, and each variety has its place in commerce. Merino sheep produce the best wool because their fleece has a more even texture than any other type. The staple is relatively short ranging from one to five inches, but the fiber is fairly strong, fine and elastic, and has good working properties. Merino wool also has a maximum number of serrations, totaling as many as three thousand to the inch.

Quality as applied to wool is an elastic term because variation in wool fibers is primarily caused by breeds of sheep, and often there is wide variation within the same breed and even in the fleece of the same animal. Climate, rainfall, food, health and type of care, all have their influence on the type of wool produced. Some fibers are long and capable of withstanding the rigor of extreme cold, whereas others, because of staple length, are better adapted to milder regions and to animals which wander over wide areas where fodder is scanty. The fine varieties are usually short fibers, but if, in addition to being fine, the fiber is also long, it is much more valuable. Length is of secondary importance. An important factor in quality is the number of crimps or waves of curly irregularities in the fleece, for these are responsible for the resiliency which imparts strength and resistance to the finished cloth.

The widest range in wool quality exists in sheep bred for mutton, as in this case fleece is of secondary importance. The fiber is coarse, short and of inferior quality, and although it is important only for low-cost fabrics, yet production volume exceeds every other type of wool fiber. Wool from the shoulder of mutton sheep is considered best for strength and length, and wool from the sides is next in value.

A natural defect which very seriously detracts from the value of any wool is the presence of what is known as kemp. This is an opaque and structureless fiber frequently present in the wool of badly bred sheep. This fiber will not absorb dyes, and consequently the defect appears prominently in the finished fabric unless it is corrected in some way. Kemps are believed to be survivors of the almost extinct outer coat of sheep. They are short, coarse, brittle fibers which, although easily identified in fine fleece, are not so readily distinguished when fleece is coarse.

Wool is slow to ignite and has a characteristic small, slow flame that sizzles and curls but can easily be extinguished. Woolen cloth and wool cease burning when fire is withdrawn. Wool ash is crisp and dark, is easily crushed and falls into irregular shapes. The ash has a strong animal odor, quite similar to burnt hair or feathers, which indicates the presence of animal substance or of fiber obtained from an animal. This offensive odor is due to sulfur. Wool is the only natural fiber that contains this chemical, normally to the extent of 4%. The other elements found in wool are: carbon 49.25% to 50.6%, oxygen 20% to 23.66%, nitrogen 15.88% to 17.7% and hydrogen 7%.

The main distinction between wool and hair is that hair is straight, whereas wool is curly. Hair is rougher and stiffer than wool and lacks its felting properties, but often there is greater variation between extreme types of sheep wool than between hair and wool. Of course, the real difference is in basic structure, for whereas wool fiber has layers of overlapping, horny scales, hair is straight, somewhat lustrous and comparatively inelastic. It is smoother and stronger than wool, and the serrations of hair are much less marked and quite often do not project at the edges. Hair consists of a shaft, which is the main body, and the root, which is the part of the hair held within the skin. The hair shaft ends in the tip, one of its most important parts, for it must be kept intact and uninjured, as the tip contributes to the value of the fiber. Hair can be classified either as bristle, represented by the short, straight, stiff hair of the dog, or as beard, represented by the mane of horses. It is quite true that sheep produce long, stiff, beard-like hair, as well as the short, flexible, curly type. Both fibers have occasionally been obtained from the goat, which often has a lower layer of woolly hair, and Siberian goats have a hairy coat in summer, which, in winter, gives place to a covering of wool.

Between hair and wool are several fibers which vary in number of scales and degree of projection. Among these are the fibers of the alpaca, vicuna, llama, suri, huariza, guanaco, Bactrian camel, Cashmere and Angora goats and allied animals.

Common goat hair is of much less importance than sheep wool. This long, shaggy hair has been used from time immemorial for fabrics that were called upon to repel exposure and strain. Goat hair is spun in the same manner as wool and is largely used for worsted weft yarns. It is also often mixed with sheep wool for selvedge yarns. When used for bags for holding fruit and grain, it was called sackcloth, and because its quality was poor and its weaving rough, Oriental religious groups often wore it to symbolize poverty, humility or repentance. In the early ages, the fibers of sheep and goats were so nearly alike that it is uncertain whether, as first woven, the famed Cashmere shawls were fabricated from hair produced from the goat or from rough wool produced from early sheep. It must be admitted that the shaggy covering of the goat is very different from that found on a well-cared-for sheep, but in many parts of Asia, sheep and goats commonly pastured together and produced offspring which bore a resemblance to inferior breeds of sheep.

# WOOL AND WORSTED

THE STORY OF WOOL and its use from semi-civilization, through medieval centuries to modern times, is the story of the most important animal fiber, one that has been of the greatest use to man for countless centuries. Wool has always been closely associated with the needs of man, and no other fiber has afforded him greater protection from varying degrees of heat and cold, for wool has been used almost as much on the deserts of Arabia and North Africa as on the frozen steppes of Russia and the hills of Scandinavia. The civilization of which we are a part is, in all essential textile phases, a wool civilization.

We owe a debt of gratitude to those ancient people who discovered that animal fibers could be converted to useful products by man. Except for their ceaseless efforts to improve what was later called "this miracle of nature," man could have survived in only a limited area and could not have migrated to those zones in which are the present-day great nations of the earth. Quite obviously, animal hair was early recognized as potential material for clothing, for of all the wide range of natural fibers, hair, alone, is especially grown by man and beast to protect the body from wind and rain, and to mitigate the effects of the extremes of temperatures in varying climates.

The important part which the fleece of sheep has played in the welfare of ancient tribes and even nations has been the theme of tribal traditions and ancient fables, many of which reflect the remote age which first witnessed the use of fleece grown by wool- and hair-bearing animals. In the more northern countries, where cultural progress was long retarded, wool predominated as a textile raw material and, in time, also became the traditional clothing material, so much so that even today it is the favored fabric.

Ancient records disclose the great antiquity of woolen fabrics and the early importance of sheep. Various kinds of wool used in ancient times are not only described by Pliny but are also referred to by other early writers.

The raising of sheep for food was anciently common, not only to Mesopotamian nomads but also to a few wandering tribes of Eastern Europe, notably in the Caucasus and Crete. However, it was in the Mesopotamian region that wool developed most rapidly and fabrication of fleece into cloth seems to have originated about 4200 B.C. Perhaps the most ancient evidence of wool comes from Tel Asmar, or Great Hill, near the Euphrates River, where, under successive levels of buried cities, archeologists found clay seals, indicating an elaborate system of individual ownership of sheep and wool, proving that as long as about 6000 years ago there were barter and use of wool.

The earliest record of the use of wool in Europe comes from a Scandinavian bog grave which archeologists assign to the first Bronze Age, or possibly about 3000 B.C. From this grave have been recovered coffins hollowed from oak logs which have yielded several garments made from wool which had been woven not unlike present-day Harris tweed. Woolen fabrics have also been found in ancient graves near Kertch in the Crimea. Kertch was a Greek colonial port of trade and fortress even prior to the time of Herodotus in 450 B.C., and he records that woolen fabrics made in that town "were dyed with powdered leaves of a plant (believed to have been indigo) that could not fade in the sunlight or be dimmed by water."

We have practically no information about ancient methods of preparing wool for the loom. It seems that the introduction of tools for preparing wool was very slow. Before the use of the card, undoubtedly, wool was prepared either by human fingers or by using the teasel, a plant widely grown in ancient times expressly for that purpose. This plant is the present-day thistle, and from its Latin name, Carduus, comes the current name of this textile tool. The comb, long in common use, is said to have been designed by Bishop Blaise and was first used at his monastery on Alderney Island, from where it was taken first to Flanders and subsequently to England. Bishop Blaise had served his church in Armenia and was afterwards raised to Episcopal dignity during the reign of the Roman Emperor Diocletian, under whose orders he suffered martyrdom. The first European application of a wheel to the spindle, for the purpose of spinning, is not accurately recorded, but it seems to have been used in the period of revived activity which followed the Dark Ages. This form of spinning wheel was widely used in Flanders, and the spinners chose St. Catherine as their patron saint because she had been tortured on the wheel.

The reasons for adopting woolen clothing were many and varied. Some of them can be traced to the fact that, because of the superior pliability of wool, it could easily be woven into more convenient forms of cloth than could flax fibers, and another reason may have been the ease with which it could be spun and woven by a family unit. Unquestionably, the weaving of woolen cloth created a form of new wealth for nomadic people, which in turn had an influence upon neighboring tribes who also gradually adopted it.

When, during medieval and ancient times, the production of woolen yarn and cloth was restricted to the home of the flock owner, and any business connected with it was transacted by trained servants, there was less opportunity for improvement in design, than when, at a much later date, weaving cloth became the profession of a particular group. Even after the manufacture of woolen yarn and cloth had attained in Europe the excellent level of Asiatic fabrication, it made practically no important advances for several centuries, but what was known about it was widely spread along both shores of the Mediterranean Sea.

When land transportation became more highly developed and narrow paths were replaced with roads, an expanded demand for cloth resulted, and the former volume of raw wool became totally inadequate. Only in the very early phases of woolen cloth making, was the bulk of raw wool spun where sheep raising flourished. Just as the purchase and use of wool crossed national borders, so also did the search for markets for the finished cloth. This condition brought many problems of finance and transportation, which, from the 11th to the 14th centuries, were none too easy to solve, for it involved traditional habits in countries as diverse as India, Persia, England, Flanders, France, Italy and many smaller countries.

Wool fabrics are of two main types, woolen and worsted, the difference being in the spinning of the yarn and the appearance of the finished cloth. A clear-cut division between the two types has, in later years, become largely modified, because of the use of both yarns in the same piece of cloth, a combination made to obtain greater strength, thinness and suppleness in the finished fabric, as well as to give novelty in design and texture. The process of weaving woolen and worsted cloth merely takes advantage of inherent structural characteristics of the wool fiber, and each year the techniques improve, continually enhancing the usefulness and beauty of the fabrics.

Woolen yarn is the product of wool formed by a number of fibers, each ranging from one to four inches, by crossing, circling, and entangling with each other, with the ends projecting from the core. It is made from wool that has been carded so that fibers run in many directions. No attempt is made to straighten them prior to spinning, and so no formal arrangement of them exists. Most woolen fabrics have a characteristic soft, fuzzy surface, and when the yarn is gently pulled for a breaking test, it stretches easily because of its remarkable elasticity. The breaking pattern shows fiber ends that are wavy and spiral in shape. Woolen yarns are more loosely woven than worsted yarns and are therefore, especially desirable in heavier-weight cloth. They do not have the crisp, wrinkle-resisting features of worsted but possess special virtues of warmth and color. This type of yarn readily responds to milling processes of fulling or felting, giving the fabric a greater density. The appearance of woolen cloth varies greatly as wool fibers range from the short, soft, crimpy merino fibers, to the long, lustrous fibers of the Angora goat of Asia Minor and the coarse, long hair of Chinese sheep. Many of the beautiful tapestries of the Middle Ages were fabricated from woolen yarns.

Worsted yarn is made from wool of relatively straight fibers over four inches long, regular and fine for their length. It is carded so that the fibers are quite parallel, and these are bound together in a spiral formation by means of twisting, the result being a smooth, regular and fairly lustrous yarn, free from kemps and of good color. This treatment is called "combing" to distinguish it from the treatment of yarn used in woolen cloth. Worsted yarn does not readily respond to the milling process known as fulling or felting and, therefore, does not impart a density equal to woolen cloth, but worsted fabrics have a well-defined weave and a clear, or even "thready" finish that means a smooth texture. A pure worsted cloth has been called the best guarantee of 100% wool.

Linsey-woolsey is a coarse hand-woven cloth having a warp of linen and a weft of woolen yarn. It has not been generally used for about eighty years but is occasionally revived by modern craftsmen.

# FELT, AN ANCIENT FABRIC

THE SURFACE OF WOOL FIBER is distinguished from hair by overlapping scales that project toward the tip of the fiber. This means that, when the fibers are subjected to moisture, heat and pressure, they can move in but one direction only. This causes them to become entangled and to form a fibrous mass by clinging together, or felting. The word "felt," which comes from the German word "fulzen," carries out this thought, for it means "to groove or join together." It is the ability of these serrations to felt that made sheep the most valuable of all animals to man, even in prehistoric times. From the evidence of recovered sheep bones we know that this is true. Even at that time, as a result of felting, it was quite possible to produce a usable fabric without the ingenuity of spinning and weaving, making felt the oldest of fabricated fibers and one of the few traditional textile products which have been handed down from primitive days. The discovery of this valuable property of wool greatly increased the value of any form of animal hair which possessed it.

Felt unquestionably was placed in use immediately after man abandoned the use of animal skins for garments. It is presumed that loosened and matted wool, shed by wild sheep, was collected from the ground or from bushes, and after it had been pressed into solid masses was put into practical use by primitive man. Thus, was established one of the earliest household crafts, for when it was discovered that a medium-thick roll of felted fleece could be utilized for clothing, it was, presumably, welcomed as replacement of animal skins that required frequent reworking to become pliable enough for comfortable wear. Although many authorities assert that wool fibers so used formed the first fabricated clothing for man, we should not overlook the fact that, in the oldest remains of man in which any form of wool has been discovered, the meager fragments that have been recovered were crudely woven. Perhaps the weaving process quickly followed, for when it was observed that, by using simple moisture and pressure, even unmatted fleece could be converted into a compact but pliable substance, the first step was taken to produce woolen cloth. In this simple, original state, there were only two wool fiber products, felt and crude, coarse, woolen cloth, for the textile needs of that remote period were easily satisfied.

Originally, wool was obtained from a species of wild sheep, and it was a short, fluffy undercoat partially concealed by hair. If not found in matted masses, it was pulled from a carcass after an animal had been slaughtered for food. As man's intelligence increased, he reproduced a natural felting action, which he may have analyzed in matted wool, by pounding moistened wool as it lay on a flat stone, or other fairly level surface, thereby quite unconsciously establishing the first textile mill. The combination of historical and ethnological fragments of information has fairly well established the early history of felt with reasonable accuracy. We know that the primitive processes of making felt were similar wherever felt was used and that in early historical times the principal tool seems to have been a long, harsh mat upon which loose wool was spread layer upon layer, until the desired thickness was reached. The mat was then rolled up under foot pressure, then unrolled and rerolled from the opposite end. We know that manipulation by rolling forward and backward was continued for from six to eight hours, after which the wool fibers became closely felted and ready for use.

It is no exaggeration to state that without wool, and its by-product felt, the life of the nomadic tribes of Asia, whose ancient activities are so intimately connected with the civilization of the Mediterranean on the west, and of China on the east, would have been greatly modified, for the greatest use of felt was made by these nomadic tribes of Central Asia where its need was fundamental. Felt supplied most of the artificial necessities of primitive man who, like all nomadic people, lived in tents which had to be made resistant to both wind and rain yet had to be portable enough to synchronize with a nomadic form of existence. This is the principal reason why many anthropologists credit both the discovery and the ancient development of felting wool and hair to primitive nomads of Central Asia.

In ancient times, tents were and, in many countries where today tribesmen yet live in the manner of their ancestors, still are the usual type of home of all nomadic and semi-nomadic people. These portable habitations were originally made from animal skins stretched as tightly as possible on poles. The top cover was also an animal skin, but at a later period tents of the ancestors of Arabs, Turks, Kurds, Tartars, Mongols and other present-day, semi-nomadic people were made of felt converted from sheep wool occasionally mingled with the hair of goats, camels and other familiar animals, or of coarse cloth woven from the wool of black goats. Either type of tent covering would quickly felt and thus become proof against the heaviest rain. At a much later time felt was also used as a floor covering to replace rushes and coarse straw mats which served as beds until, at an even later period, rugs were introduced for that purpose. Among some of the ancient tribes felt also seems to have been associated with religious and ceremonial practices, for these have come to light among ancient relics found in Central Asia. The ancient Armenians wore a crude form of felt head-dress in some of their religious ceremonies.

Which of the many hundreds of tribes that anciently roamed Central and Western Asia was the inventor of felt is impossible to determine, for the origin of the art is lost in the dawn of civilization. Neither the ancient Scythians nor the later Mongol tribesmen had a system of writing through which to preserve their early history as did the contemporaneous Egyptians. Nevertheless, we know that Mongol yurkas, or conical tents, were constructed of thick felt fabricated from both wool and hair which, after having been soaked in a strong bath, was trodden by foot, and that this thick, coarse, tough fabric was mounted on cylindrical, wicker-like frames, capped by a conical roof, the ribs to hold it up being fastened spirally to wooden uprights. This primitive abode long served the purpose, for it offered sufficient protection from the blasting cold of windswept plains, and, for an Asiatic nomad, it was a home that, upon short notice, could be quickly dismantled and moved to another location whenever grazing lands became exhausted, or in case warlike tribes threatened attack. Genghis Khan and his troops lived in just such pre-fabricated dwellings during their march from Central Asia to Europe, for as his armies advanced, these tents could easily be disassembled and transported on the back of camels or by ox-cart, but when in use they gave his troops familiar and comfortable surroundings that must have been of psychological value. These troops also used felt for outer garments.

Marco Polo, who was temporarily in the diplomatic service of China, states that "the houses of the Mongols are circular and are made of wands (wicker) covered with felt.

These wands are so strongly bound together, and likewise so well combined, that the frame can be made very light. They also have carts covered so skillfully with black felt, that no rain can get in." In 1246, Plano Carpini also describes Mongol huts as "round and made like tents, from twigs interwoven, having a round hole in the middle of the roof for admission of light and passage of smoke, the whole being covered with felt."

No mention is made of felt in the older Chinese documents, but about the 4th century B.C. it appears that felt rugs were used as mattresses. It is probable that they copied this use of felt from some wandering tribe with which they traded. The Chinese raised sheep but never utilized wool for any fabrics. Woolen cloth has always been alien to Chinese civilization. North China was in age-old contact with the vast pastoral, nomadic population of Central and Northern Asia, restless hordes which constantly poured over Chinese frontiers raiding and pillaging unprotected villages of Chinese farmers. The most formidable of these predatory tribes were the Hiung-Nu who were the ancestors of the Huns of Europe and with whom the Chinese had military engagements which lasted for several centuries. They wore tight-fitting coats and tall boots of felt as protection against knives and arrows, and lived in portable tents of the same material.

There is not a single trace of the use of felt in ancient Egypt, although a primitive type of sheep was raised in Lower Egypt, but in the history of ancient Greece felt is often mentioned. Much of what is known about it during the classical period comes down to us in Greek literature, for the Greeks lived in close proximity to the less civilized, roving Scythians whose habitat was the plains and coastal area of what is now Southern Russia. The Scythians raised a fine type of Colchian sheep, using its wool in the form of felt. Although there is no record of Greek use of felt in the form of tents, yet they utilized it for the classical head-covering that so often appears on the statues of gods and even of prominent men. Probably the earliest reference to pilos, their name for felt, occurs in the "Iliad" of Homer, where it is related that Odysseus customarily wore a hide helmet lined with pilos in typical Scythian fashion. The most general use of felt in Greece was in the form of tight-fitting, conical-shaped caps worn by seamen and artisans. These caps could be pulled over the ears as protection from rain and cold. Felt was also used by the Greeks in the form of heavy, rainproof garments. Pliny records that the Greeks sometimes impregnated felt with a kind of vinegar made from lactic acid from mare's milk. "This made it useful as armor, as it could turn the blade of a sword, and protect the wearer from arrows." This seems to have been a chemical discovery of utmost importance to the Greeks. There is also a record of felt used in place of metal armor by Caesar's legions when they were attacked by Pompey's archers. Thucydides refers to a similar use of felt as an arrow repellent. When besieging or defending cities the ancients frequently used felt in conjunction with hides, and even sackcloth, to cover wooden raiding towers and other military equipment used in ancient times.

Ancient Iranian tribes, which then lived in an area extending from Western China to the steppes of Southern Russia, were active producers of felt and are thought to have been the first Oriental people to weave rugs from wool, the direct result of primitive felted floor mats. Xenophon refers to felted quilts, made in Media, which were spread over couches, or used as rugs on the ground to be sat upon. One ancient Chinese record tells of an Iranian prince who wore a felt cap adorned with gold and precious stones. Strabo, the Greek historian, described the Persian war cap as "felt in the shape of a tower," explaining that such caps were necessary because of the cold climate. The Persian king, however, was distinguished by a stiff felt hat which stood erect, whereas his subjects wore their tiaras folded and bent forward. Priests of Zoroaster, or Persian Magi, followers of the sun god, wore high turbans of felt, and the Lycians who aided in the assault on Greece, led by Xerxes, king of Persia, wore felt caps surmounted by plumes of rare birds. These were also called tiaras. Common soldiers of the Persian army wore light, flexible caps of felt, and this type of head-gear was also issued by Xerxes to his Medes and Bactrian allies. Tamerlane, the formidable Mongol conqueror who invaded Persia in the 14th century, is credited with inventing a felt hat which protected his soldiers from the rays of the sun, as well as from rain. As this was a different head-covering than was normally used in the East, it also served to distinguish the troops of Tamerlane from their enemies.

Felt appears to have been known in India from very early times. Nearchus, the Greek general who accompanied Alexander the Great on his expedition to India in 325 B.C., reports that the people of India understood the art of felting wool.

Some Chinese Buddhist pilgrims started on a memorable overland journey to India in 399 A.D. and, among other references to habits of various people they met, one item was about the people of Western China who "wore coarse clothes, like those worn in the East, some wearing felt ond others cloth of hair." This is said to be the earliest authentic account of the use of felt in what is now Turkestan, which at that remote period had not yet been occupied by Turks who were then living in Mongolia. Chinese records also tell of tribute offerings sent in 742 A.D. to the Chinese Imperial Court by a local king on the island of Ceylon. Among these were several pieces of white felt which were particularly acceptable, for white felt was thought to be endowed with a peculiarly sacred character.

There is always the possibility of legend when anything can be traced to ancient origins, and felt is not free from this fantasy. One such legend ascribes the commercial development of felt to St. Clement I, the fourth bishop of Rome, and still the patron saint of hat makers. It is related that, while on a long flight from Rome, he often became footsore and weary. He endeavored to ease his pain by stuffing rabbit fur into his sandals, whereupon the combination of moisture, motion and friction converted the loose fur into a felted mass. It is said that St. Clement described his discovery to textile workers he met on the journey, and from this incident, felt manufacture began in Europe.

Another, and more modern, legend is built around St. Feutre, "a certain monk who dwelt in the city of Caen, in the days of Robert the Devil," of France. It happened while on a pilgrimage "to the abbey Aux Hommes, founded as a religious house by William the Conqueror, in expiation for his sins inasmuch as his marriage to Mathilde was displeasing to Heaven." He started out with a new pair of sandals made by the cobbler of his abbey. Often "his feet were sore and worn," but he accepted this as part of his penance. From time to time, however, he passed flocks of sheep and would gather a handful of wool "to put in his sandals for his feet to tread upon and thus ease the soreness." Upon reaching the distant shrine he took off his sandals, and in the bottom of each was "a new cloth, unknown before, firm of texture, soft to the touch and strong, made from the wool of sheep, tramped down by a pilgrim."

# WOOL AND SWISS LAKE DWELLERS

LONG AFTER THE ERA when man lived in caves and clothed himself in animal skins, a race of semi-advanced people called Swiss Lake dwellers, or Pfahlbauten, made their home in various parts of the Lake districts of what is modern Switzerland. These ancient people are known to have been familiar with domesticated sheep, for sheep bones have frequently been found in the silt of their lake houses. These sheep seem to have been a small animal of Asiatic breed, probably carried westward by the ancestors of the Swiss Lake dwellers with whom we are more or less familiar. The earliest inhabitants of this area were a race of primitive people ethnically members of the Mongoloid stock of Asia which, from the earliest historic times until early in the Middle Ages, periodically invaded Europe. Somewhat later, the early Lake dwellings, which from time to time seem to have been rebuilt, were invaded by still another Asiatic race who apparently migrated by way of Mesopotamia. These latter people brought with them the so-called Turbury sheep, whose ancestor was the Kopet Dagh which had been domesticated in the Caspian Sea area.

From strati-graphic chronology, it has been estimated that the twenty-foot level of Pfahlbauten remains dates from about 8250 B.C. and that Turbury sheep (Ovis aries Palustric) attained full development about 6250 B.C.

Although the earliest relics of Swiss Lake dwellers are stone tools which date from the Paleolithic or Old Stone Age, yet remains of their pile houses reveal that, more than ten thousand years ago, many generations before man had any other use for a wheel, the Swiss Lake dwellers of the Neolithic or New Stone Age had designed spindle-whorls from baked clay or stone as fly-wheels for spinning wool and flax fibers into thread for nets, baskets and crude clothing. It would seem that every member of these ancient households took a part in making cloth, and because of primitive tools, it must have been a long, hard task. The raw wool they used was tangled and filled with dirt, and before it could be spun into yarn, it had to be cleaned by crude brushes, a few of which have been recovered from the silt which for centuries covered the remains of their homes. There is no evidence, however, to prove that any large amount of fabric was made from wool, as cloth relics, so far recovered, were made from less perishable flax, or a flax-like fiber.

# WOOL IN EGYPT AND INDIA

ONLY IN DYNASTIC EGYPT do we unsuccessfully search for a record of wool. Until the advent of northern Semitic tribes and of later Greeks and Romans, it had always been a part of Egyptian religious practice to forbid the use of any and all animal fibers in temple ceremonies, or for burial garments. This practice carried over into private life, although the ammon type of sheep was raised for food, which meant no scarcity of raw wool of medium quality. Quite possibly, this attitude towards wool and woolen fabrics had its origin in the long and often tyrannical rule of the so-called shepherd kings from Western Asia, who conquered Egypt about 2000 B.C. and who, in common with other tribes of Mesopotamian ancestry, wore richly embroidered woolen clothing; or it may have been due to the fact that, many times in the long history of Egypt, alien shepherds ranged their flocks on Egyptian soil for hundreds of miles in search of pasturage after former grazing grounds had been practically denuded of all plant life. At any rate, wool, as an animal fiber, was looked upon as unclean and therefore unholy, and its use was long forbidden, particularly for mummy wrappings. It was even thought that the gods disapproved of wool and would have shown their anger in no unmistakable manner if any wool or woolen cloth had been taken into tomb or temple.

In pre-dynastic Egypt, a short loin-cloth of linen was commonly worn by people of every rank, but the Semitic invaders wore longer loin-cloths of wool, often decorating them with colored fringes. Later, these northern people developed a close-fitting, woolen tunic which completely covered the body, something the Egyptians had never thought of, but, being prone to copy desirable customs of other people, they finally adopted this type of garment. Herodotus tells of woolen mantles trimmed with fringe worn by men of Northern Egypt, while citizens of higher rank wore woolen garments of finer material and of different cut to distinguish themselves from men of less exalted station.

Belief in existence beyond the grave, a keystone of Egyptian religious thought, was something new in the experience of man. It found its most striking expression in the burial of the dead, and the mummies of ancient Egypt were always characterized by a peculiar mysticism, which was typical of that age and land. Continuity of life after death appeared so natural to the Egyptian priesthood that, to them, no soul could enter the haven of Osiris without a body with which it had been associated when living on earth, and thus the mummy typified an important fragment of one of the many phases of an original and exotic culture now long extinct. Other ancient civilizations also devised funerary customs, but none were comparable to the ritual of ancient Egypt. From the very beginning, religious laws forbade burial in fabrics made from animal fibers, because it was thought that fleece of sheep was hospitable to worms which might ultimately injure the body of the deceased. Until oppressed by a series of invasions by northern Semitic tribes, the Egyptians never used wool for any object placed in Egyptian tombs, and even at this later time wool was not used on the body itself. Not until the advent of the Greeks and Romans was either cotton or silk used for ceremonial burials in Egypt.

One of the ancient water routes of commerce between

Egypt and India was the Red Sea. This body of water, called "Mare Rubrum" by the Romans, "Eruthra" by the Greeks and "Yam Suph," or sea of red seaweeds, by the Hebrews, was not so named because of the color of its water due to decomposition of seaweeds, but because of the ancient Phoenicians who lived on its shores and who were the first people of record to use it. To the Greeks, the Phoenicians were "Phoinikis," or red-skinned people, as distinct from the yellow-skinned people of Asia and the black-skinned people of Africa. Passage of trade over the Red Sea between Egypt and India took place as early as 1700 B.C., and it may well be that wool and woolen cloth were articles of commerce.

The ancestors of the Hindu people of India appear to have branched off from the ancient Persians who are believed to have entered the Punjab about 2000 B.C. They were a simple Aryan people who tilled the land and herded sheep, as had their Persian ancestors. The word "aryan" implied a good family. The Sanskrit root "ar" meant "to plow" and is found in the Greek word "era" or earth. Because, like civilized people, they ploughed the ground, Aryans considered themselves the noblest of human races. As a heritage from such an origin, wool appears to have been known to India from very ancient times. This is evident from the injunctions of the "Institutes of Manu" which prescribe that wool be used for the "sacrificial thread of the Vaisya." That a semi-sacred character has long been attributed to wool by the Hindus is also shown by the fact that Parayana Sara Sangraha directs that the sacred Sradh ceremony be performed only when clad in woolen cloth, as oblations offered to ancestors when such clothing was worn were thought to have been "like a sradh performed in Gaya." The Harita Smriti, one of the Dharma Shastras, asserts that "fire, woolen cloth, Brahma grass and Kusa grass, these four were created pure by the All Good Brahma." A number of other religious practices of ancient India is also associated with wool. We have a record of woven woolen cloth and exquisite shawls of wool having been fabricated by natives of India at the time of the expedition of Alexander the Great.

# WOOL AND THE HEBREWS

THE MOST IMPORTANT Hebrew record of ancient days is the Old Testament which is mainly history and literature with infrequent references to textile technology, many of which are incomplete. Originally the Hebrews were a pastoral people and for many centuries were not versed in industrial arts.

According to the Biblical narrative, Adam and Eve "sewed fig leaves together and made themselves aprons, and in fabricating this Egyptian-like garment they became the first human beings to manufacture clothing. Evidently, this simple garment did not find favor, for a little further along, the narrative states that "unto Adam and his wife did the Lord make a coat of skins and clothed them." Here we detect an enlargement of knowledge to include animal, as well as vegetable, fibers as potential clothing for the human body. Not many references to wool are found in the Bible, but Orientalists are of the opinion that this "coat of skin" was some form of tunic which, during the early centuries, was in common use by the Hebrews as an ordinary form of dress, and which, undoubtedly, was a sort of woven substance probably of wool.

In the story of these coarse woolen garments we have also a suggestion of the ancient occupational division of shepherds and agriculturalists as represented by Abel, the worthy man who was a "keeper of the flocks," and by Cain, the reprehensible character, who was a "tiller of the soil." This may indicate that the ancient Hebrews regarded shepherding as more honorable than farming, for throughout the Biblical narrative, there is abundant evidence that the Hebrews held the shepherd and his profession in high esteem.

Ejection from the lush Garden of Eden and the advent of a nomadic existence converted sheep raising for food and clothing into a primary objective of finding pasturage for flocks. In this way, the world's first family became a prototype of all primitive nomadic people who, for untold centuries, ceaselessly wandered "to and fro over the face of the earth," to seek fresh pasturage for their flocks which were the only form of wealth they possessed. Even in those remote days, it was known that root-grazing sheep temporarily ruined any area over which they had foraged.

There is no Biblical allusion to spinning and weaving prior to the Deluge, but it is highly improbable that a people so far advanced as were these patriarchal Hebrews, who already were skilled in reducing iron ore and were able to design and build the escape vessel we call the Ark, could be ignorant about some primitive form of spinning and weaving, especially as their earliest ancestors had been familiar with sheep. We read in the Old Testament that Jabal, the son of Lamech, was "the father of such as dwell in tents and have cattle." If these tents were in any way similar to other tents of antiquity, it would certainly point to a knowledge of rough weaving, for they were not used in a country where wild animals skins could be easily obtained.

Subsequent to the Deluge, there are frequent Biblical references to suggest the existence and use of textile fabrics of various kinds. Noah, when overcome with wine, lay uncovered in his tent, whereupon his sons, Shem and Japhet, "took a garment and covered him," an episode which occurred before sufficient time had elapsed to have made garments from a post-flood crop of either flax or fleece. Therefore, this garment must necessarily have been fabricated sometime prior to the beginning of the journey on the Ark. When finally reestablished on a dry world, the Hebrews seem to have possessed some textile ability although they still favored the pastoral form of activity. However, an old Oriental legend relates that Ham, second son of Noah, made all the clothing for the family because he had been instructed in spinning and weaving prior to the Deluge. As a survivor of that catastrophe, it is logical to assume that Ham continued this activity and that his descendants followed in his footsteps. At any rate, the Oriental legend closes with the statement that when people became more numerous and migrated south and west, they carried their knowledge of spinning and weaving to Canaan, where they became workers in wool, and to Egypt, where they became workers in linen. Both of these industries, according to the anonymous Oriental, were organized by descendants of Ham.

Originating, as traditionally the Hebrew people did, on the fertile plains of the Mesopotamian area between or near the "two rivers," Abraham, and probably his predecessors, were owners of vast flocks and herds. The Hebrews frequently inter-married with neighboring people whose mode of life was similar to their own, thereby enriching their cultural and political life. These marital alliances often resulted in giving and receiving dowers of sheep and goats, for to them, as to all the various racial groups of that area, sheep and goats represented Oriental wealth and social rank.

The early Hebrews were essentially a migratory, pastoral people. Abraham, Isaac and Jacob are beautiful symbols of the type of life which was led by those ancient tribesmen and is still being pursued with little variation by the Bedouins, or "wandering people," of Arabia. The ancient Hebrews roamed within and outside of "the fertile crescent" in age-old efforts to find adequate pasturage for their large flocks. Compared with present-day sheep raising in that part of the Near East, the flocks of Jacob, and of even later Hebrew sheep owners, were of almost incredible size. It is interesting to know that the "hundred pieces of silver" mentioned in the Bible were keritan, which literally means lamb.

The flocks of Laban, the Syrian, of about 1760 B.C. are the first ancient sheep of which we have specific account. His flock-master, and son-in-law Jacob, grandson of Abraham, was a scientific sheep breeder who not only knew how to multiply his patron's flocks but also recognized the advisability, through selective breeding, of perpetuating any accidental varieties of sheep that might contribute to the family wealth. Unlike most flocks of that era, Laban's sheep seem to have been thoroughly domesticated but, as usual, were promiscuously mixed with goats. The sheep fleece was brown, whereas the goat fleece was black. The color of the fleece on the sheep would suggest a rudimentary step toward the ultimate goal of a light-colored fleece, but this probably excited no surprise in the Syrian country, as it might have done in some other Asiatic communities of that era. The Old Testament narrative thus seemingly confirms the fact that knowledge of cross-breeding of sheep to obtain a lighter shade of wool was known at a very early time in Hebrew history.

The Biblical narrative also states that Jacob was unwilling to impart the knowledge of his methods to his father-in-law, who evidently wished to know how it was possible to alter the color of fleece to suit his flock-master's purpose and also how Jacob was able to keep the fleece practically free from black fibers that occur in the wool of almost every species of wild sheep. Jacob seems to have devoted many years to his experiments as a scientific sheep breeder, and, at the end of his fourteen years of "service to win a bride," Jacob accepted the offer of his father-in-law, Laban, as a reward for diligent stewardship, that portion of the large flock which displayed any white fleece and all lambs that possessed a mottled coat. Jacob had taken unusual measures to breed a white-spotted and ring-streaked flock and had achieved results far in advance of his era. In the neighboring deserts of the Near East, where men had limited association with their fellows, and where the urge for more valuable property in the form of better bred sheep was less urgent, sheep retained their original wild color for another five hundred years.

From the association of Jacob, the Hebrew, with a flock of sheep in Syria, of sufficient size to conduct wide-range experiments, arose the first recorded changes in flock-breeding in the Eastern world. Later, this new variety of sheep not only established itself throughout Syria and on the shores of the Mediterranean Sea but also spread south as far as the deserts of Arabia, so that, within three hundred years, fleece of a light color had become so normal that a devout Biblical poet of that era compared it to snow. Shortly thereafter a lyricist described the teeth of his swarthy mistress as being "like a flock of sheep, new from washing." We may be inclined to dismiss these enthusiastic allusions to white wool as the fancy of poets who employed Oriental comparisons, yet in fairness, we should admit that a newly evolved color of fleece provided some basis for the simile.

After removing from Ur in the Chaldees, Abraham and his immediate successors roamed for many years, usually locating their temporary camping sites not far from caravan routes which led from Mesopotamia and the East, to Egypt. The father of Joseph, so the Biblical record informs us, moved his family and flocks "to a land wherein his father was a stranger." He searched for suitable grazing land on the alien soil of Shecham and Dothan, both alongside of ancient caravan routes to Goshen, as the Hebrews called Egypt. This practice offered definite economic advantage for a "one industry" people who raised live stock on a large scale, for they were then in a favorable position to barter meat and wool for clothing and the exotic products normally transported by the caravans. It was with a caravan of this type that Joseph met a fate that boded an unpromising future but actually was the first step in a historic career.

The flocks of the Hebrews must have been extensive. Not only had they been trained in scientific sheep breeding, but from time to time they increased their holdings by confiscations of flocks held by vanquished foes. By victory over the Hagarites, the tribe of Judah acquired two hundred and fifty thousand sheep, and very much earlier, Moses took six hundred and seventy-five thousand sheep from the Midianites, the ancestral tribe of his wife. The defeat of the Moabites not only added about seven hundred thousand sheep to Hebrew flocks, but Mesha, King of Moab, "rendered annually unto Joram, King of Israel, an hundred thousand lambs, and an hundred thousand rams with the wool." Syria, Mesopotamia and Palestine abounded with sheep, and the Psalmist is moved to rapture by the sight of "hills covered with flocks." Carmel, Edom, Kedar and Shecham are all associated with production of wool. The feast of Nabal of the house of Caleb, on the occasion of shearing his flocks, is mentioned in the Old Testament. Nabal is described as a "great man whose possessions were in Carmel and he had three thousand sheep and one thousand goats, and he was shearing his sheep in Carmel and behold, he held a feast in his house like the feast of a king."

The land of Pilista, or Philistines, was originally called Canaan by the Hebrews, because it had been peopled by descendants of Canaan, grandson of Noah, and their occupation of the coastal strip, which today is Palestine, is thought to have continued for more than seven centuries. Upon settling in the land of Canaan, the Hebrew people gradually passed from a pastoral to an agricultural mode of life and, being more permanently located, ceased to live in tents, as had their patriarchal ancestors. Their great prophets, notably Isaiah, Ezra and Jeremiah, however, frequently referred to tents, but this may have been a form of nostalgic symbolism.

Even prior to their experiences in Egypt, Hebrews understood the technique of weaving the hair of goats and camels into tents and the fleece of sheep into clothing. Undoubtedly, this primitive attempt at weaving resulted in no better fabrics than were produced by neighboring tribes, who merely used a few small sticks placed horizontally, upon which they stretched spun yarn, the transverse yarn being drawn through by nimble fingers unaided by a shuttle with which even Stone Age textile workers were familiar. It is probable that it was this type of loom upon which Delilah wove the famous locks of Samson, for the Biblical account informs us that she performed her work while he slept. Her unsuccessful attempt to secure her vigorous victim is related in the statement that "he awakened out of his sleep and went away with the pins of the beam and with the web." This pictures a rather fragile handloom and also confirms the belief that the horizontal loom was customary with the Hebrews, as it was with neighboring tribes.

Although Biblical references to the use of vertical looms by the Hebrews is very meager, yet we know that after they arrived in Palestine they learned how to weave on vertical looms. The Old Testament story of Judah and Tamar, dating from about 1600 B.C., shows evidence of weaving woolen yarn into a sufficiently thick veil to conceal the features. Among the Hebrews, wool spinning was the work of women "who were wise-hearted" (industrious), and in this respect they followed a custom common to all historic races. Illustrious examples were Isis in Egypt, Minerva in Greece and Arachne in Lydia, but probably the spinning of Isis was confined to linen yarn.

Among the ancient Hebrews woolen cloth was in general use for all ordinary wear, although for special occasions and for specified persons of high political or religious rank, garments of linen were imported from Egypt. Usual clothing included a cloak of wool, and it is probable that they wore this type of garment when they entered the Promised Land, and even continued to do so when in captivity at Babylon. The soft, woolen garments worn in the king's palace were not the rough, homespun, woolen fabric used in the cloaks of the common people but were probably more like the close, smooth-faced broadcloth still worn in the Near East. Throughout the story of ritual garments worn by the Hebrew priests, it is frequently stated "no wool shall come upon them for they must not use any garment that causes sweat." Of this injunction, Maimonides, a Hebrew philosopher of the 13th century, observed that a mixture of wool and linen in ritual garments was banned to prevent a form of pagan idolatry, for "heathen priests wear such garments in the hope of a fortunate conjunction of planets, bringing blessings to the sheep, or to the flax."

Later edicts directed to the people forbade them, also, to wear "garments of divers sorts, as of wool and linen, and it shall not come upon thee." The very meager mention of wool in the Old Testament is usually of a negative nature, although with unexpected liberality, the Psalmist praises the woman "who seeketh wool and flax and worketh willingly with her hands." It is interesting to reflect upon the fact that, after their flight from Egypt, the Hebrews abandoned their wide use of wool, although with the various tribal groups who lived or roamed in the regions traversed by the Hebrews to reach their Promised Land, wool was almost the only fiber used for clothing. The Hebrews apparently abandoned their historic appreciation of wool during their long sojourn in Egypt, and it never again recovered favor among them.

Deep emotion influenced the use of sackcloth. It was a penitential fabric. During periods of great personal or national affliction, the ancient Hebrews, and the Assyrians as well, laid aside garments designed for ease and comfort and put on sackcloth, a peculiarly prickly fabric woven from coarse, short goat hairs twisted together and used for both warp and weft. The garment, worn solely to inflict as much discomfort as possible and thus express penance or grief, was cut to fit the wearer closely, like a sack, and was shorn of all trimmings and other adornment. It is interesting to recall that wrapping cloth made from goat hair was used for sacks by ancient Greeks and Romans and that the Hebrew word for this cloth was "shac."

As early as 700 B.C. many Hebrews who had settled near the coast sold their excess homespun woolen cloth to the Phoenicians who, in turn, dyed the fabric with their renowned Tyrian purple dye and then resold it at their many settlements along both shores of the Mediterranean Sea. An interesting Biblical reference to purple dye is the story of Lydia of Thyratira, the modern town of Akhissar, which was situated on a Roman military highway from Pergamos to Sardis, a road that St. Paul knew well. Here in the 1st century A.D., Lydia, a friend and often a hostess of St. Paul, sold purple dyes used for decorating the woolen uniforms of Roman officials stationed in that area. It is believed by some authorities that, for a long time, Hebrews held a monopoly in dyeing wool. In 1160, Benjamin of Tudela, a Spanish rabbi from the Kingdom of Navarre, made his way to Mesopotamia and Palestine by way of Rome and, in a detailed report made in 1173, stated that Hebrews were the sole dealers in wool at Jerusalem and that two hundred of them had established a monopoly in wool dyeing. In Italy at that time, the wool dyeing profession was almost entirely in the hands of Hebrew technicians who were said "to have excelled all others in artistry and original color combinations."

# WOOL IN MESOPOTAMIA

HISTORY SHOWS QUITE CLEARLY that Mesopotamia is the birthplace of wool. From the dawn of civilization, various tribes of that area have been famous for their flocks. The Old Testament calls this general area Babylonia, Assyria and Chaldea, but the Greeks called it Mesopotamia, or "the land between the rivers," and it is by that name that the various successions of ruling nations are known in the records of textiles.

The history of Mesopotamia extends as far back into the past as does the history of Egypt, but it is not as easy to interpret, for many different races of people have made that area their home, and at one time or another, each rose to power. The "earliest historical settlers," the Sumerians, from the fortified city of Sumer, and their conquerors and successors in authority, the Chaldeans from Ur, the Assyrians from Akkad or Assur and Nineveh and the later Babylonians, all raised sheep and harvested wool, for regardless of race, creed or color, these occupations were the common heritage of that ancient land. This was because of a favorable climate and terrain, and it led to entirely different standards of textile craftsmanship from those which for so many centuries had been practiced by a contemporaneous civilization in the less extensive valley of the Nile.

In the Tepe Gawra, or Great Mound, of Mesopotamia, at the eleventh level of a series of twenty buried cities, all constructed from sun-baked bricks, there have been found the bones of ancient domesticated sheep. Records on clay seals recovered in the same debris indicate that these bones date from about 4000 B.C., or thirty centuries prior to the fall of ancient Troy. Some of these clay seals bear a picture of a ram's head, and archeologists believe that this indicates ownership by an individual who was also a dealer in raw wool.

Describing an ancient covered pot which, when found, contained sheep bones, a well-known authority suggests that about 6000 B.C. a migratory horde came from the East and eventually spread over India and Mesopotamia, but that we know so little about this early migration of man that it is impossible to determine with any accuracy whether any race had previously inhabited the Mesopotamian plains. The invading race may have been the so-called "Painted Pottery" tribes who, upon arrival in that country, spread from an area near the future site of Babylon to what is today Southern Russia, and they are thought to have been the ancient people who had previously domesticated the argali. Certain it was that they were pastoral in their tribal habits, and when we learn more about these primitive people, we shall know more about the early history of wool in the Near East.

From 3000 B.C. to about 500 B.C., Mesopotamia boasted several great cities of historical importance, and of these, Babylon, Ur and Nineveh are mentioned in Biblical records. For many centuries power swayed between these ancient, warlike people, but finally in 606 B.C. Persians and Medes, joined by Chaldeans, took Nineveh from the Assyrians only to fall before the armies of Cyrus, sixty-seven years later.

From very early times the manufacture of woolen cloth was an important industry in Mesopotamia, and although not a single piece of ancient woolen cloth, nor even a loom, has been found, yet cuneiform inscription relates many ancient details incident to the buying and selling of wool,

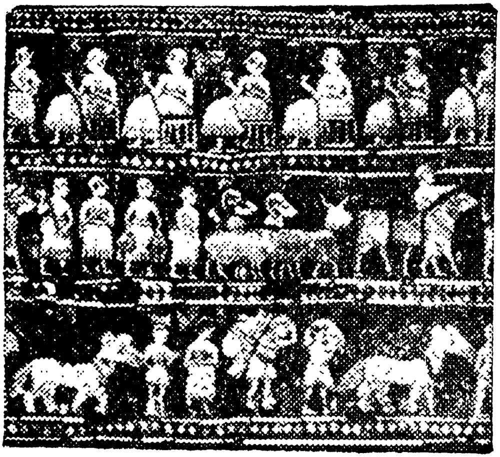

FIGURE 1

Earliest Representation of Sheep of Ur, Circa 3500 B.C.
(Courtesy of Burkart-Schier Chemical Co.)

together with references to weavers, dyers and merchants. We are also informed regarding current prices for the raw and finished wool cloth and of regulations with reference to length and breadth of woolen cloth. Another cuneiform tells of the sale of wool, a length of black woolen cloth, a robe and a piece of thin woolen material for which transportation cost was five shekels of silver. This is interesting because it shows that Mesopotamia possessed metal currency in 3000 B.C. while Egypt had not progressed beyond the barter system. These clay tablets also tell of workshops where slaves wove wool into cloth which was sold either in the local market-place, or sent to neighboring settlements to be bartered for other goods.

From the earliest days of what is called Mediterranean civilization until almost the advent of the Middle Ages, preparing wool and processing it into yarn and cloth were largely the work of slaves. Especially in the Mesopotamian area, slavery was a strictly regulated State institution, recruited in part from war captives and, to a less extent, from oppressed minorities. All of the successive Mesopotamian empires practiced slavery, and from them, the custom spread to Greece and Rome. One ancient clay tablet records that a master wool weaver, in return for an amount of money, agreed to teach wool weaving to a few slaves of a local merchant but, failing to do so, bound himself to reimburse the merchant for time lost by the slaves. Merchants, and even kings, owned woolen workshops where slave weavers toiled under the stern eyes of overseers. Once each year in the interests of these cloth merchants, and possibly in his own interest, the king would send out a caravan loaded with woolen cloth, for even prior to Biblical times wool was the symbol of wealth.

These ancient Mesopotamians considered wool weaving a mastercraft, and apprenticeship was long and arduous. One contract relates that a cloth master sent a slave for an apprenticeship of five years, and this seems a long time, but when the wide variety of color and design is considered this long period seems reasonable. Due to the ingenuity of the better class of cloth merchants who used slave-woven materials, dress styles changed more rapidly than in any other ancient country.

Since about 3000 B.C. when the ancient loin-cloth, once the sole article of apparel but later worn in battle only, was superseded by a clearly defined style of dress, costumes worn in Mesopotamia changed very rapidly, if not in essentials, at least in design and manner of wear. Over a long undergarment was thrown an outer garment which was a loose, single strip of woolen fabric thought, by many textile historians, to have been the ancestor of the present-day shawl, and this garment found a permanent place in the dress habits of man. It was many yards long, embellished with a wide fringe and, when worn, was wound obliquely around the lower part of the body, one end of the strip being tucked into the right side of the undergarment while the other portion was flung over the left shoulder and then fell to the ground, leaving the right arm and shoulder uncovered. With slight modifications, this type of woolen garment was later adopted by both Greeks and Romans. Soon a belt was added to this long outer garment, and citizens of various Mesopotamian areas, never a pacific people, quickly learned of a convenient place to nest a dagger.

In the earlier years of Mesopotamian history, this costume appears to have also been the garment of the gods. The few portrayals of Assyrian women, however, show costumes with long sleeves as a concession to modesty, but the colors of their woolen robes must have been gorgeous, for the ancient cloth weavers became expert in dyeing wool. Unfortunately, due to the dampness and heat of the Mesopotamian plains, but few specimens of these ancient fabrics have survived. Among the various color combinations that appear in ancient records are purple-blue, blue and red-brown and red-yellow; this latter combination is recorded as having the effect of gold. A garment pictured on a vase recovered from an ancient tomb shows a green robe with hems and fringes on which red and green alternate, while colored circles and rosettes decorated the border of the garment. At Babylon, it was the custom to dye raw wool before it was spun, as this was insisted upon by an early type of cloth guild at the head of which was a "rab," or master.

The people of Mesopotamia always favored heavy woolen garments of rich pattern with heavy fringes, and from this definite style of ornate dress, there developed a great textile industry based on wool, the ancestral fiber of Mesopotamia and the most important source of State revenue. The fortified city of Assur, later the capital of the great Assyrian Empire, maintained posts throughout Asia Minor, and Babylon was a market-place for both grain and wool. As this trade expanded, Phoenicia contributed dyes of purple and crimson, and gold tinsel yarn, which in no small way helped Mesopotamia to reach a textile perfection elsewhere unknown, for those ancient, woolen-cloth artisans explored broad fields of both color and design, and they made the most of them.

# WOOL IN GREECE

LONG BEFORE THE ANCIENT NATION that we call Greece had developed a Western civilization as we understand it, an even more ancient race of people had dominated the Aegean world for a period estimated at two thousand years and during that time had developed a culture of high quality. It may be true that the invading Asiatic hordes that overwhelmed these ancient people, and who, at a later time, emerged as the Greek nation, knew little about their more civilized predecessors, but archeologists have brought to light the fact that these Minoans, who almost certainly lived on the Island of Crete and possibly at scattered places on the Greek mainland, had been familiar with sheep and had made limited use of wool. When, about 1100 B.C., the invading Asiatics almost entirely destroyed the culture which had been developed by the Minoans, they spared the sheep that their predatory bands encountered, for they were familiar with these animals as a source of food and, to a lesser degree, as a source of clothing for protection from cold and rain. The invaders not only perpetuated these sheep but, by later cross-breeding, actually improved the Minoan breed.

Topographically, Greece was well suited to sheep husbandry, for it is largely a mountainous country with no wide rivers or hot plains, and therefore, its inhabitants have always used wool more than any other textile fiber. Throughout the ancient history of Greece, sheep culture was always considered important and was not only mingled with much of the private lives of the people, but also with some phases of their religion. The patient and tender shepherd was always a prominent figure in Grecian song and story. Only the theme of love exceeded the theme of idealized pastoral life as an inspiration for poets. Upon retirement from active duties, many of the great men of Greece found pastoral activity a favorite recreation. Incidentally, in ancient Greece, children occasionally wagered dinari and pecunia on the toss of the astragali, which were small squares carved from knuckle bones in the feet of sheep. Many modern votaries of chance will recognize these simple devices.

Odysseus and other great chieftains of Greek mythology probably wore coarse woolen cloth, although in cold weather Homeric Greeks normally dressed in sheep and goat skins, usually with the fur still on. However, as described by Homer, the principal articles of dress for Greek men was a woolen smock or shirt of intermediate length, which usually reached the knee. In battle this was worn under armor. Long woolen chiton (shirts) reached the ankle and, after the 2nd century B.C., were dyed in various colors and often decorated by a patterned hem. Both men and women wore long sleeves on their clothing. An outer cloak of heavier woolen cloth served as protection against cold and rain.

Greece, as the nearest western country to Asia, was the first country in Europe to feel the impact of Egyptian and Asiatic culture, and this, in time, changed the habits of a primitive and turbulent people and caused them to evolve a civilization of their own. They ultimately adopted the more highly developed textile arts of those countries.

It is quite probable that, during the so-called Homeric ages, Greek dress for both men and women was made almost entirely from some form of wool, for at that early time, fabrics like linen, silk and cotton, even if known, were little used or, as in the case of linen, used only occasionally by women. In classical Greece, however, sheep and goats of Asia Minor, North Africa and the Levant amplified the native supply of wool and hair for the cloth industries which sprang up, notably at Miletus.

Homer, one of the greatest folk-lore writers, often made use of the legends of Greece to describe their ancient ways of living, manner of dress and social customs. He tells us that both Charon and Odysseus, as "followers of the waters," often wore tight-fitting, rain-repelling, felt caps and that Greek sailors wore boots made of felt, the oldest form of wool fiber. Homer also tells us that the early Greeks were especially fond of dressing their many gods and goddesses in fine-spun, gaily colored, woolen cloth, and his many descriptions of the clothing used on Mount Olympus confirm the opinion that Greeks of the Homeric era actually produced woolen fabrics of great fineness and beauty. It should be remembered that the Greeks were the first people to "humanize" their gods, thus freeing worshippers from the unknowable, an idea that had not previously occurred to man. Egypt dedicated statues of stone to human forms having heads of birds or beasts; Assyria and other Mesopotamian countries carved statues of beasts with human heads; and the Hebrews and, later, Christians worshipped an invisible deity, whose likeness it was forbidden to depict.

However, the bolder Greeks evolved a "human" god, gave him an engaging family and made Mount Olympus, in Thessaly, a pleasant place where gods and goddesses, clad in expensive raiment, banqueted and otherwise lived a normal, if festive, life. The Greeks, however, with but a few exceptions, were careful to keep their gods sober, making it a rule, especially in the case of the sun-god, to pour honey, and never wine, on his altar, because they realized that much depended upon the constant and clear vigil of this particular god in connection with flocks and crops. Each of the gods worshipped by the early Greeks had an individual temple and was worshipped at special seasons. At such times, the best woolen weavers and needle women would make new robes for the god. All day long the weaver of wool would stand before his upright loom, and when the dress had been woven other workers would embroider it with thread pictures depicting some adventure of that particular deity. Occasionally, these fabrics would be sold to the public in order to raise funds for temple purposes or to purchase food for attending priests. Eventually each temple had its own woolen-cloth workshop, and fabric originating from it would be sold for temple maintenance.

The era described by Homer, during which period Greeks were either farmers or warriors, lasted for several hundred years, and in poetic literature appear many references to wool and its various uses in the days of the "Glory that was Greece." Homer and Virgil describe the cultivation of wool and the subsequent manufacturing processes so minutely that we can form a vivid conception of wool in all of its many stages preparatory to its final form as clothing. Virgil devoted a large part of his "Georgics" to a discussion of the various breeds of sheep and to the then prevailing method of treating wool, for even in the zenith of her political and commercial power, Greece still looked upon wool as one of her most important assets. In this connection, it may be interesting to note that the word "clew" came from a ball of woolen thread which, as it was unwound, was dropped on the ground by Theseus as he advanced in the labyrinth to slay the minotaur, so that it would guide his return to the entrance.

In ancient Greece the weaving of woolen cloth was almost entirely a household function, and, in spite of comparatively primitive equipment, wool was carded, spun and woven much as it had previously been in the Lake villages of Switzerland. The degree of perfection finally attained by the Greeks in making woolen cloth was so excellent that they were not faced with frequent changes of style. Although most rural homes were equipped with at least one loom and accessories for cloth making, weaving wool into cloth very early became a distinct occupation, carried on by a separate class of citizens called "textores," the ancestor of the modern word "textile."

The Greeks left but little record of their dyeing processes for, like the ancient Romans, their early appreciation of color was rather limited. According to Pliny, Greeks, at the time of Alexander the Great, dyed wool "red and other colors," but early historical writers of Greece tell us that the art of wool dyeing was brought to that country by Phoenicians whom the Greeks succeeded as sea-faring traders. On many occasions, Homer refers to dyeing woolen cloth with crude vegetable dyes so it appears that dyes had long been known in Greece. An interesting exception, however, was the attitude of Sparta which enacted laws to banish every wool dyer, because "they robbed wool of its natural white." Dyeing was regarded in Sparta as "a falsification of nature." Nevertheless, Spartans in time had their woolen battle dress dyed scarlet in order to prevent blood from showing in case a warrior was wounded.

Women of ancient Greece considered wool spinning and weaving one of their important duties, for it was peculiarly suited to the secluded habits of Greek women and was engaged in by both rich and poor. In the palace, and even in the farm house, if the latter was of sufficient size, a separate room was usually assigned to this activity, for woolen cloth was fabricated in the humblest home. Even princesses looked upon the work as contributing to the comfort of those they loved, and idleness was not in fashion even among the noblest Greek women. It is related that the fabulous Helen, after she and Paris had run away to Troy, "busied herself with the work of directing the spinning and weaving of costly woolen cloth for garments which was done by maidens of her household." Odysseus, husband of Penelope who, like the fair Helen, had been taught to spin at an early age, often returned to Greece with slaves who were taught to convert wool into cloth. Homer also tells us that one noble Greek woman started spinning wool fleece "before the sun rose, and was still turning the spindle, laden with wool, when night fell."

It was in such occupation that noble women of Greece often contended for fame, and with their own fingers drew homespun woolen thread through all the mazes of the hand loom, happy if they could make a richer and finer garment than one fabricated by a friendly rival. Many of these fabulous garments won a place in both the legends and history of Greece. A salutary effect was produced upon the textile progress of Greece by such innocent competition, and its influence gradually spread to women less high in the Greek "Social Register," and although the latter often worked with imperfect raw materials and woolen yarn frequently home-spun in a coarse manner, yet it was their purpose to produce soft woolen fabrics comparable to the linen imported from Egypt. An old and obscure book entitled "Ancient Greece" suggests that "the women of Greece were not mere creatures of luxury and show, but they possessed considerable energy and much skill in the useful arts of spinning and weaving."

Certain Greeks became famous for a single kind of cloth. The dyed woolens of the colonial city of Syracuse were the pride of Greek cloth merchants who knew only coarse woolen cloth colored with native-grown vegetable dyes. As trade developed, the Greeks made woolen cloth of fine texture, but they never attained a style of elegance, and it was only at about the end of the classical period that Greek textiles reflected the influence of the Near East. Where this influence was felt, the Greeks became famous for beautiful patterns either woven or embroidered on woolen fabrics. These designs were not only conventional lozenges or stars, but also animals, birds and flowers, all in beautiful colors. The soft woolen vests, which Greek warriors wore beneath a coat of mail, were often richly embroidered by women of their household.

By 500 B.C., Greece had become the chief trading nation of the Mediterranean area and remained so until the Romans took over in 145 B.C. The Greeks had organized sea routes quite similar to those previously operated by the Phoenicians, and they were the first European people in historical times to extend their sovereignty beyond their own mainland. Even as early as 600 B.C. Greece possessed over two hundred colonies, some of them as far distant as on the northern shores of the Euxine (Black) Sea. Woolen cloth made in Greek workshops found its way to all parts of the ancient world and, with other native products like figs and olives, was bartered for exotic wools to be used in Greek temples and for African ivory from which Greek artists would carve images for the temples. For several hundreds of years, Greece was the most active trader on the Mediterranean Sea but was ultimately forced to give way to the Romans, who converted the "Middle Sea" into "Mare Nostrum" and the Greeks, driven inland and becoming subject to Roman rule, abandoned all thought of commerce.

The early Ionian colony at Miletus was especially famous for its fine woolen fabrics, and the raw wool that was used is thought to have been obtained from the Coraxi tribes, a race of ancient people who, at that period, had long lived at the border of Europe and Asia, and who may have been the first Caucasians. Even in those remote days, the Coraxi were known for their "Golden Fleece," from which were made shawls that, about 540 B.C., were mentioned by Hipponey of Ephesus, although it is possible that these ancient shawls had been fabricated from goat hair, as were the equally famous Cashmere shawls of a later period and which writers much more modern than Hipponey likened to "fleece of camel."

After the advance of the armies of Alexander the Great in Persia and India, Greek generals and princes endeavored to match the glories of the royal courts of Babylon and India, and bartered with merchants, or took as loot any fine fabric which came their way.

The Greeks were so thoroughly enthusiastic over wool for cloth that when they first saw cotton they described it as related to wool. Aristotle, a contemporary of Alexander the Great, identified growing cotton which he had seen in Persia as "wool bearing trees," further stating that "the pods of this tree contain seeds which are taken out and the remaining substance is combed like wool." Nearchus, one of Alexander's generals, also saw growing cotton and reported "there are in India, trees bearing bunches of wool and the natives make garments of it." Writing about 445 B.C. Herodotus stated: "There are trees which grow wild there (India) the fruit of which is a wool exceeding in beauty and goodness that of sheep. Natives make cloth of this wool."

# WOOL IN ROME

Wool was the first raw fiber to be converted into clothing by the Romans and was invariably worn by all classes of citizens. Prior to the Empire period of unprecedented prosperity, even civilized Romans were largely unacquainted with any other type of clothing. The word "cloth," incidentally, originated from the Parcae of Roman mythology. Clotho was one of the three Fates who wove human destiny, while Lachesis spun the thread of life which finally was cut by Atropos, thus ending life. The Greek word "clothein" meaning "to wind" comes from an allied source.

The early Romans had many opportunities to learn cloth making. These came from a variety of sources, one of which is believed to have been the descendants of Swiss Lake dwellers who are reported to have found their way into Northern Italy long before Rome was founded and when the natives were essentially a race of shepherds. These early immigrants were called Terramara people because they are believed to have built houses on platforms over swamps. In mounds left by these primitive people, have been found loom weights and spindle whorls, proving that the Terramara people were familiar with cloth making about 1100 B.C. Etruscans, who may have been refugees from battle-scarred Troy or perhaps had emigrated from Egypt, conquered the pastoral Terramara people, and objects recovered from Etruscan graves reveal that they, too, were skillful weavers, wearing woolen robes much like garments depicted on early Greek vases.

The early Romans, however, like their descendants who lived during the Republic and the Empire, lacked the temperament to become weavers, and it can be said that, at no time in her history, has Rome, great as have been her contributions to human affairs, made any but negligible contributions to textile progress. The Romans did not invent anything new in the textile arts, preferring to follow the habits of other nations. To a large degree, Roman dress, even during the classical era, was an adaptation of the woolen garments of their predecessors, the Etruscans of about 800 B.C. This consisted of an undergarment, or tunica, and a mantle, or toga, both made from woolen cloth. The tunica consisted of front and back pieces sewed together, belted about the waist and reaching to the knee, except when the wearer was at ease in his home and released the belt, thus converting the tunica into a comfortable, loose gown.

The men of Rome soon adopted a loose, woolen outer garment, similar to the Greek mantle, which they called a toga and which was thrown about the person. This garment was worn only by freemen, as the birthright of a Roman citizen who, upon reaching legal age, had the toga conferred upon him at a solemn ceremony. Great care was observed to drape the toga in folds prescribed for various classes of citizens. It was worn during both peace and war, but in battle, the end, which in peace time was draped over the left shoulder, was wrapped around the waist to form a girdle, thus freeing both arms. Unlike Greek woolen mantles which were rectangular in form, the Roman mantle, or toga, was elliptical, the usual length being three times the distance from the shoulder to the ground. One end was thrown over the left shoulder and permitted to hang down in front while the other end was drawn around the body.

The toga came in two weights: (1) toga densa, or hirta, a thick, heavy garment made of heavily napped woolen cloth, worn in winter, and (2) toga tirta, or rosa, a thin, smooth garment, made from light material similar to worsted, worn in summer. Both tunica and toga were preferably made from white wool, but very often the toga displayed colored embroidery denoting the rank of the wearer. Roman women also wore this form of clothing but added a light, woolen shawl, large enough to cover their whole figure.

Like many other people of that era, the Romans had no distinctive clothing for the lower part of the body. Northern nations were the first to use hose, which originally covered not only the legs but also thighs and loins in a single garment. Only a few centuries ago, a division was made, for the first time, at the knee, thus forming knee breeches, later called trousers from the French word "trousse" which means to tie or lace up tightly. The original trousers were probably bifurcated, long, woolen gaiters reaching to the thigh, separately worn on each leg and kept in position by fastening with a strap or girdle. When trousers as we know them today first began to be worn about one hundred and fifty years ago, the "Annals of Cambridge" declared "they are not considered respectable to be seen in," and they were ridiculed as a throwback to Roman slaves who wore trousers because, not being citizens, the toga was denied them.

Early Romans were familiar with two grades of woolen cloth, each kind being made from wool grown by two very different types of native sheep. Trita, or threadbare woolen cloth used by the common people and lower ranks of the army, was woven from the fleece of a long-wool sheep named hirsutum. Densa cloth, used for the toga pingus, was a fashionable, napped and felted fabric woven from fleece of a fine-wool sheep raised in Southern Italy and known as molle, which means soft. There are many indications that the Romans attempted to improve this breed of sheep and produce wool of even finer quality, and it is recorded that molle sheep were often covered with a glovelike, thin skin to preserve the soft fibers from heat and wind. It is from molle wool that, in all probability, the famous "transparent costumes" of that era were woven.

Although coarse wool for the army and middle class citizens was imported in large quantities from Gaul, and goat hair was brought from the hills of Greece to be made into cloaks, slippers and even sleeping rugs for the army, yet the Romans owned large flocks of sheep and were seriously interested in improving a migratory type of sheep, the wool of which was of remarkably fine texture. In every part of the Roman world, wool production was considered important, but especially in North Africa, Gaul and Spain where, even in that era, fine wool from one of the ancestors of merino sheep enjoyed a good reputation by Roman cloth makers.

In many parts of the Roman area, woolen-cloth weaving was carried on as an auxiliary home occupation. One important wool-weaving center was Sybaris which, about 650 B.C., had been founded as a Greek colony. With Greek permission, this colony was ruled by a matriarchy and nearly twenty-six hundred years ago, in an effort to reduce noise, the women rulers gave the world its first zoning ordinance, when, by edict, they relegated "to the distant hills, all who raise sheep or are makers of bronze."

During the years of the republic, Roman citizens were almost exclusively attired in woolen garments, and not until the advent of the Roman Empire did this type of clothing cease to satisfy wealthy Romans who then brought more expensive fabrics into general use. However, some of the sturdy old Romans looked with displeasure upon the new fashions, considering them too effeminate for hardy citizens, and this important group stubbornly clung to woolen tunicas and togas. Caesar Augustus insisted that the women of his family adhere to simple customs of the earlier days, and this position was also more or less observed among Roman nobility. Notwithstanding inroads made by the exotic fabrics of Egypt, India and Mesopotamia, the making of woolen cloth continued to remain an important function, and in spite of comparatively primitive equipment, the Romans were skillful in spinning and weaving wool. Even women of the highest rank, although lacking the patience of their less fortunate sisters, attained a high degree of perfection. As a much greater volume of finished cloth was demanded, the weaving of wool finally became a separate occupation, carried on, as in Greece, by experts who were called textores. These early artisans were also acquainted with a number of different coloring extracts for dyeing woolen yarn and cloth, and divided these colors between what they called major and minor dyes. Major dyes were used for coloring woolen garments for both sexes and also for general use. Minor dyes were again divided, some colors being exclusively used in clothing for men, whereas others were exclusively assigned to clothing for women.

The Romans learned of felt from the Greeks and even adopted the Greek word "pilos." They devised a tight-fitting felt cap called pileum, which they wore at festivals, theatrical performances and often at meals. It is a curious fact that, among Romans, this felt cap was considered a symbol of liberty. When a slave obtained freedom, his head was shaved, and a skull cap of undyed felt was placed on it. This cap could subsequently be worn in public places. At the death of Nero in 68 A.D. the common people of Rome wandered about the streets giving exuberant expressions of their joy over the event. Suetonius, in recording this unusual occurrence in his "Life of Nero," speaks of the plebs pileata or "felted mob." It is a moot question whether the Romans transmitted their knowledge of felt to Celtic and Teutonic people, or whether the use of felt in medieval Europe is not a heritage from an even earlier civilization. It is quite probable, however, that these northern nations learned of felt from some Germanic tribe in the Middle Ages, and that the latter acquired their knowledge from Slavs, their eastern neighbors, who in turn learned about felt from tribes of the Caucasus, descendants of the early Scythians.

When during the 2nd century Rome gained mastery of the Mediterranean Sea, she quickly expanded water-borne trading with Asia and Egypt. Rome could now import any textiles that Romans desired, for in this era of increased trade among the nations of the ancient world, Rome was the terminus of most of it. Patterning after the colonization experiences of the Ionian Greeks, Rome, as speedily as possible, gathered colonies and dependencies of various kinds in all parts of the known world. The labor of these subjected people provided practically all the textiles that a prosperous victor required, and Romans who, at first, had lived frugal lives apparently had little time to become accustomed to wealth. Dress became so elaborate that finally the Roman Senate passed the Oppian laws which regulated dress in time of war, but when Roman matrons lobbied for repeal they were permitted to dress as they pleased.

However, a few isolated Roman communities still persisted in making woolen cloth, although it was never as finely woven as were the woolen fabrics of Greece and Persia. To meet this situation several Roman emperors made every effort to induce skilled foreign workers in wool to settle in the Imperial city, even promising some privileges not granted to Roman citizens. Victorious Roman armies returned not only with beautiful textile fabrics but also with enslaved foreign weavers who could duplicate them. Normally sturdy Roman citizens became discontented with simple woolen garments favored by their ancestors, but later Roman emperors, eager to restore production of woolen garments, took steps to encourage better grades of fleece throughout their expanding empire, which was so vast at its zenith that textile arts of one province would be entirely unknown elsewhere. To overcome this condition, a system of "colleges" was established "to collect, perfect and publish" various textile practices throughout the empire. Some skilled woolen cloth weavers were brought to Rome and settled in distant provinces where, in return for special privileges, they instructed less skilled people in making woolen cloth. Until the downfall of Rome in the 5th century, Romans remained expert in fabricating woolen cloth, although at no time, was it as finely woven as were imported woolen fabrics.

During a few decades of the 1st century of the Christian Era, priests officiated at the altar of their churches in the same garments which they normally wore in private life, but St. Jerome commented: "We should not enter the altar in every-day clothes, but in clean garments and with clean conscience." St. Cyprian usually wore a white woolen tunica and a woolen mantle such as any Roman citizen would wear. After the 3rd century, this tunic was made of linen.

With the fall of Rome in 410 A.D. Western civilization sank into what is called the Dark Ages, during which the making of woolen cloth, although never very actively carried on was not entirely lost. This depressed era lasted over five hundred years, for it required that length of time for Teutonic invaders to absorb even the rudiments of culture. These semi-barbarians, who had overthrown and sacked not only distant provinces but also Rome itself, were used to little better garments than those made from rough woolen cloth. They manufactured little and therefore had no surplus with which to engage in trade, so in a large part of the former empire woolen cloth weaving was dormant, and few records exist which mention production of woolen cloth. Local farmers grew only what was essential to maintain their families, for the presence of semi-barbaric vandals made the lot of every farmer precarious. His flocks grazed in peril of being confiscated for food, and the farmer, himself, was looked upon as the property of the victor, who marked the boundaries of his farm with the point of a sword and disposed of farm workers as he pleased. Even such oppression could not completely destroy the raising of sheep and collection of wool, but it operated to reduce the cultivation of land, and this offered such scant pasturage that many sheep wandered away and bred promiscuously. It is, of course, impossible to determine how much Roman sheep deteriorated during this period, but we know that fleece of European sheep did not improve until nearly six hundred years had passed.

# WOOL IN MEDIEVAL ITALY

After the decline of the Roman Empire in the 5th century, woolen-cloth weaving in Italy was carried on almost exclusively as a household vocation for domestic consumption. If any immediate post-occupation textile trading was done for nearly four hundred years it was solely with a few natives who lacked either the equipment or the ability to weave woolen cloth. The renaissance in the textile field occurred in the monasteries and convents of Italy where, about the 8th century, "a stout woolen cloth of excellent quality" was fabricated in many religious houses for the use of its members.

After five centuries of alien oppression, the feudal system became dominant in Europe. Under this system all land was held under royal grant by hundreds of local lords who agreed to associate themselves with the monarch in any of his military operations. To each landlord were attached various retainers ranging from freemen to actual slaves whom he had purchased or had captured in battle. Slaves and serfs cultivated the land and were often permitted to own small holdings in the neighborhood of their master's castle. They were protected by law against being sold, and this was the genesis of the small villages which developed so gradually during the Middle Ages. Because there was no system of wages, a little additional income was desirable and could be derived from a planned unit, so that various extra activities developed, among which was spinning raw wool and weaving the yarn into cloth.

As the lord's castle waned in influence and was replaced by the town, descendants of the original economic unit of the castle entered familiar specialized fields of work. Soon, cloth weavers borrowed or made tools for fabricating cloth from raw wool and personally sold it to neighbors who engaged in other vocations. This is believed to have been the origin of the handicraft system of cloth manufacturing, and with it arrived the separation of the general production of cloth from a household function into a specific, if at first merely local, activity. Very frequently craftsmen, like cloth weavers, who worked with a very seasonal raw material, produced more cloth than they or their few customers required, so any excess product was exchanged with neighbors who provided food or could contribute a form of skilled service. This was often done at a village square and may have been the origin of the town market-places, as it certainly was of European cloth fairs.

Here we find the origin of the jobber or middleman, who produced nothing but sold everything, and in time relieved the actual producer of the strain of finding a market for his products. From this early phase of local and neighborhood markets in a feudal era, sprang the national and international commerce in woolen cloth which made some Italian cities both prosperous and famous.

The period of European history that is known as medieval was actually only a slow political transition from feudal to modern times. As the ancient Roman, Greek and Persian sovereignties passed out of existence, temporary chaos finally ended in the emergence of new nations like England, France, Flanders and, most important to cloth fabrication in Europe, a score of small but important city-states of Italy. During the chaotic period, as we have seen, the art of fabricating woolen cloth was not entirely lost, but to survive it needed outside stimulation, and this it received from many sources.

In 1147 Roger II, the Norman conqueror of Sicily, successfully attacked Greece and, upon completion of his military campaign, returned to Palermo with a large number of Greek woolen-cloth weavers as prisoners of war. As spinning and weaving of wool, at that age, was exclusively a household function, each country possessed fairly large groups of trained textile workers who could follow their profession in almost any other country where wool could be raised, or at least imported. As the product of these Greek industrial slaves reached the mainland of Italy, the peculiar technique in weaving and the artistry in dyeing, or otherwise decorating woolen cloth, were permanently adopted by the cloth weavers of Florence, Genoa, Venice and other Italian city-states, and from the 13th century until stiff tariffs imposed by Egypt practically closed the Mediterranean Sea as a waterway for European trade in the 15th century, the cities of Venice, Florence and Genoa were the most important woolen cloth manufacturing centers in Europe. Although a large volume of these Italian fabrics was made from wool, yet considerable cloth was made from wool mixed with silk obtained from the Greek island of Cos, or directly from the Orient.

Thus did Italian cities finally reawaken to an active commercial life and, as the centuries passed, grow prosperous as practically the only channel of trade between the almost incessantly warring nations of Europe. Through the ports of these medieval cities flowed a large part of the textile trade of the Continent, and to them came Turk, Persian, Moor, Greek, French, English and Flemish cloth workers and merchants. So numerous and mixed were these foreigners that, at times, church officials complained of "the presence of such heathen in our country." Here they sold or bartered native raw materials and other products from their distant lands for woolen cloth and other textiles produced, at first, by weavers in their own homes, and later in shrewdly financed workshops which made a woolen cloth so excellent that Italian craftsmen found a world-wide market, even penetrating the traditional home of textiles in the Near East.

Florence "the flourishing," a name given by the Romans to a settlement on the Etruscan plains, was, in the 11th century, the important connecting link between Central Europe and the Mediterranean countries, for the rulers of Florence seem to have inherited the daring enterprise of the earlier Etruscans, who, about the 8th century B.C., came to that part of Northern Italy.

That cloth finishing is much older than cloth weaving in Florence may be assumed from the fact that, between 1050 and 1200, the city listed two hundred wool dyers, fullers and tailors (cutters) with no listed weavers or spinners, and woolen-cloth makers, as separate craftsmen are not mentioned until 1212. The rise of the medieval textile industry had its origin in neighboring monasteries and convents, where woolen cloth of excellent quality was made for the exclusive use of those religious houses.

An event of great importance to Florence and to the history of woolen cloth in Europe, as well, occurred in 1252. Probably at the time, it seemed of no great moment that a fairly large group of Humiliates, or Humble Fathers of St. Michael, an order founded in 1015, were called by their Superior to leave Alexandria, Egypt, and settle at Florence, but these industrious monks were experienced in weaving and dyeing woolen cloth. They were also skilled in applying Oriental designs to this cloth, by means of intricate looms they had constructed. Alexandria had been familiar with woolen cloth since the 2nd century A.D., and Florence is known to have had workers in wool in the 10th and 11th centuries, so while it is true that the Humble Fathers brought no new industry to Florence, yet they introduced more practical ways of producing superior woolen fabrics. Upon arrival, they were endowed with special privileges, in return for which they established workshops, and immediately occupied themselves with weaving and dyeing woolen cloth.

It is this group, later joined by lay brothers affiliated with the Benedictine Order, who really started Florence on four centuries of prosperity through her textile industry. This busy order attained such recognition in making a special grade of woolen cloth that, in 1340, it operated more than two hundred establishments and employed thirty thousand craftsmen, who annually turned out about eighty thousand pieces of woolen cloth. So important did wool become to Florence that the great artist and mechanical genius, Leonardo da Vinci, actually designed a spinner flyer and also a machine for cutting down unequal filaments of fiber on woven woolen cloth. Long after the Order had abandoned all textile activity, a "strong woolen fabric," similar to that formerly made by the Humble Fathers, was called "Humiliate Cloth."

In a more or less commercially chaotic era, when raw wool came to cloth manufacturers from England, North Africa, Spain and Sardinia, and when dyes used by textile craftsmen came not only from various European sources, but also from India, Java and the Far East, a problem of financing these purchases arose far beyond the ability of any single cloth merchant to handle. As a result of this condition emerged the merchant-banker, who, in return for a large share in prospective profits, not only assumed all financial risks but also reorganized and standardized various local processing steps in the manufacture of woolen cloth. One of his most important functions was to assure a steady flow of raw material to cloth-manufacturing centers, which in those medieval days was not easy to accomplish without much liquid money.

Many European countries had strict laws under which all raw material had first to be offered for sale in local markets before it could be purchased and shipped to foreign cloth manufacturers. However, this merchant-banker combination of finance and production seems to have made great headway in the woolen-cloth industry of both England and the Continent and, ultimately, to have become involved in political activity whenever raw materials were difficult to obtain, for these prosperous foreign operators often financed large loans, either to the Crown or to an important producer of raw wool or dyestuff. A contemporary record states that "the function of the merchant-banker is to put finished fabrics at the cloth fairs and in other markets; to buy wool and dyes; to underwrite the cost for weaving, fulling, dyeing, shearing and dressing from first to last, and for this they employ thousands of people in Europe." Very often this type of textile manufacture and finance proved a boon to individual textile workers who endeavored to escape the strict eligibility rules imposed by many Continental cloth guilds and therefore largely operated as home workers. This type of woolen-cloth worker was eagerly sought by agents of the merchant-banker, and their dealings with each other proved of mutual advantage.

No single family of merchant-bankers stands out in equal prominence with the Medici family. Florence was the home of this great family, which ruled that city for a long time and occasionally even produced Popes. In 1297, the founder of this historic clan was a member of a Florentine cloth-makers' guild, and his family, even after they had attained princely rank as bankers, still carried on the family woolen-cloth business, for that industry was firmly integrated with their conception of Florentine capitalistic economy. In fact, so closely associated were the Medici family with Florentine cloth manufacturing that, in the 16th century when the woolen-cloth trade of Florence sharply declined in favor of English woolen cloth, one branch of the Medici family, much to the resentment of Florentine "bitter enders" who remained in that city, moved their operations to England where they reestablished themselves as woolen-cloth manufacturers.

Both Florence and Venice were long dominated by noble and princely capitalists who combined shrewd financing with expert textile craftsmanship, and this offered a natural field of finance for the Medici family. They, among other merchant-bankers, became rich and powerful, extending trade contacts to settlements on the North Sea and the Baltic Sea where Hamburg and Lubeck, founded by Charlemagne as trade ports, in 804 A.D., became their distributing centers for woolen cloth and collecting points for raw wool brought back to the Italian cities by their own sailing craft.

It was a member of the Medici family who first capitalized on the woolen-cloth production of the Humble Fathers and other religious orders housed in Northern Italy and, in that way, started the great woolen-cloth industry of Florence. Through a system of local work shops these religious orders were able to weave a fine quality of woolen cloth, either from raw wool which was shipped from England in woolsacks weighing about four hundred pounds each and which was supplied to them by merchant-bankers, or from semi-finished woolen cloth which at first was purchased at Continental cloth fairs. As the length of transportation increased, the original cost "over twelve-fold" Florentine merchant-bankers and their Venetian colleagues imported only the finest quality of fleece, and this, of course, was reflected in the excellence of Florentine woolen cloth.

The growth of the merchant-banker type of activity in various Italian cities and the increase in the number of towns, between the 12th and 14th centuries, drove a great volume of rough, homespun, woolen cloth from the producing markets of Italy. This type of cloth had formerly been woven in private homes under non-standardized methods and was no longer in great demand for, along with the better grade of woolen cloth, there had also emerged a prosperous class of European citizen who demanded finer woven cloth and better design of fabric. By degrees, wealthy Florentine cloth merchants induced large numbers of skilled woolen workers to settle in their city, and this materially increased the volume of raw wool demanded for use. This situation was hailed with delight by wool merchants of Flanders, who promptly raised prices of that commodity, which they, for over one hundred years, had imported from England. The principal medieval trading market for English raw wool was at Bruges in Flanders, which, in 1334 was also the sole raw-wool center on the Continent. In view of the importance of English wool to Florentine cloth factories, the merchant-bankers of Florence met the situation by endeavoring to make themselves independent of Flemish wool dealers by purchasing raw wool directly in the English markets, as cloth merchants of Venice had previously done.

Although there are almost legendary accounts of visits by Florentine cloth merchants to England as early as the 12th century, the first authentic record dates such visits in 1223, and soon thereafter merchants of Florence took first place as foreign buyers of English raw wool. Old records state that, because of almost incessant wars between the city-states of Italy, Florentine merchants were, at first, unwilling to risk shipping their raw wool by sea, for at that time England possessed no available vessels for convoy duty, and Florence, being an inland city, had no need for a navy of her own. Therefore, for a short time, English raw wool was cleared for shipment through Flanders and from there was transported by land to Italy. Direct exports of English wool by sea to Florence, via the port of Genoa, are recorded as early as 1307, but frequency of such shipments depended upon cessation of sporadic wars between Florence and Venice.

An interesting incident in medieval raw-wool trade occurred repeatedly when Florentine merchants invited the less cultured wool raisers of provincial England to accompany them on the trip home, in order to show the English agriculturists how a better grade of wool could be converted into finer woolen cloth. When invited to Florentine homes for dinner, it is reported that the English rustics were inclined to remain at the dining table indefinitely, in expectation of more food. To meet this unusual situation, Florentine hosts ordered servants to again bring in the shoulder of venison which had previously appeared as a hot dish, but which, by this time, was cold. From this occurrence originated the term "cold shoulder" when hospitality has waned.

One of the by-products of international trade in raw wool and woolen cloth, in medieval times, was the professional role of money-changers and lenders by local Italian Hebrews and Lombards. The Hebrews originally embarked on this form of business because, in most European cloth-making centers, their race was forced out of business since they were not permitted to join the various merchant cloth guilds, although they were usually allowed to engage in the more unpleasant work of dyeing woolen yarn and cloth. Backed by wealthy coreligionists in Italy, in the 11th century, many Hebrews turned to loaning money to small, local cloth merchants and to changing foreign currency and bills of exchange. It was said of them that "unlike the cloth merchants, they were not subject to any Church law against usury," and they, therefore, succeeded in developing a highly remunerative and permanent business.

So prosperous were many Hebrews of Florence and Venice that, within one hundred years, a group of wealthy Lombards entered the same field and these two money groups long provided credit, for the hard pressed handicraft textile producers, making it possible for them to purchase raw wool and other necessary materials. In the medieval banking system, bills of exchange were accepted as currency media and were usually issued to mature at various Continental cloth fairs held annually in most of the larger cities of Middle and Western Europe. Because of this arrangement, bankers of Lombardy established branch offices in most of those cities and many of the offices became so interwoven with the local fiscal economy that they were continued for three hundred years.

The economic strategy, which had organized a virtual monopoly for purchasing raw wool from Spain and Sardinia and such English raw wool as was permitted to be exported, combined with expert textile craftsmanship, is reflected in the fact that, in 1310, Florence annually manufactured and marketed over one hundred thousand pieces of woolen cloth. By the end of the 14th century, however, Florentine cloth merchants found their first real competition in Spain and Flanders, as these countries were nearer to important and less expensive supplies of raw materials. Towards the end of the 15th century, despite estimates that placed the number of craftsmen employed in the Florentine woolen-cloth industry at twenty-eight thousand, the city experienced a decline in that industry which local merchants ascribed to "betrayal of the secrets of our manufactures" by skilled textile workers who, tired of wars and high taxes, emigrated to France, Flanders and England, where they greatly stimulated local cloth making. But even more significant was the rise of England as the first sea-power in the world and her refusal to permit foreign ships to transport English products and, as often happened, to dock at English ports. The discovery of the American continent and, six years later, of an all-water route to Asia moved the center of the woolen trade to the west coast of Europe. By the end of the 16th century, the Italian woolen-cloth cities had lost their medieval commercial importance.

Venice, which arose after the collapse of Rome, was originally a small settlement selected by refugees from "the scourge of God," as a haven too obscure for the victorious barbarians to notice. Incidentally this, and similar action by other fugitives from the terrors of barbarism, established a base for manufacturing primacy in Northern Italy which it has never lost. This highly prosperous part of Italy had never been developed by the Roman Republic and Empire and hence was practically ignored by the invaders. Very early in its resettlement, Venice successfully restored trade relations between Northern Italy and the Near East and later, joining with other resettlements at Pisa, Genoa and Florence, contributed its share towards restoring the manufacture of woolen cloth and ultimately became active in medieval trade and banking. Venice was ideally situated for buying and selling raw wool and woolen cloth, and the city took full advantage, becoming one of a few important woolen-cloth centers in Europe, a position which it sustained for centuries. In the 14th century, Venice listed over seventeen thousand woolen-cloth workers.

This revival reacted most favorably upon the shepherds of Northern Italy, whose flocks had long been dispersed by wars and decimated to feed greedy invaders. However, they failed to produce a sufficient quantity of native wool, and it was necessary for Venetian cloth weavers to depend upon a fairly large volume of importation of wool from Spain and England. In general, the wool fleece of Northern Italy, either from the culture it had received under the fallen Roman Empire, or because of certain habits which long training had ingrained in the individual animal, was in better condition at the end of the so-called Dark Ages, than was that of the sheep on the other side of the Alps.

For many years after 1000 A.D., Venice dominated the cloth and raw wool trade between Europe and Asia. Here centered the textile commerce of Greece and Arabia, of France and the Danube countries. Later, cloth merchants of England and Flanders bought and sold in the Venetian market. In the Middle Ages, the main trade route from Asia followed the coast to India and thence along the shore of the Indian Ocean to Mecca, from which port the products of Asia were carried by caravans to Egyptian ports on the Mediterranean Sea and then to Venice where they were distributed by Venetian galleys to all parts of Europe of that era. There were few European products that were needed in Asia, but the admitted inferiority of Asiatic raw wool gave Europe a great advantage,. and therefore, the superior fleece of Spain and England could be purchased with spices, jewels and silks from Asia. All these cleared through the port of Venice, and thus the sea brought wealth and power to that progressive medieval city and it was long fostered by a commerce-minded public opinion.

From the port of Venice to every western port in the medieval world went galea or galleys of Venice, often with three tiers of oars, each oar being from forty to fifty feet long and having seven or eight men to man it. These immense galleys were guided by a steering oar-board on the right side of the vessel, and from it is derived the nautical term "starboard," or right side of a ship. Because of the steering mechanism on the right side, only the left side of the galley touched port. From this custom is derived the word "port," or left side of a vessel. At the peak of Venetian activity it is believed that over three thousand galleys employing over thirty-six thousand citizens were engaged in trade. Each galley was a State-built, war-merchant ship, equipped with fighting arms and stores, and the city government sold the completely equipped vessel to responsible Venetian citizens as an early form of naval reserve. Each vessel was under command of an owner-captain who could be trusted, and who, with his crew, participated in profits from each voyage, for not until the 16th century were slaves chained to the oars of Venetian galleys.

This was the type of vessel which, early in the 14th century, traded spices or ducats for the raw wool and unfinished woolen cloth of England, Spain and Flanders, and which brought barter goods to Eastern Mediterranean ports for caravan transport to the Orient in exchange for dyes and other textile raw products. These galleys were usually scheduled to reach England and Flanders at the time when cloth fairs opened for their annual display of locally fabricated woolen cloth. When in England, each Venetian merchant was careful to conform to regulations established for foreign traders and confined his activity to a locale called "Galley Row," where he operated from a small booth assigned to him by a town official.

Up to 1284, these Venetian merchants obtained the raw wool and rough woolen cloth they required by offering spices, semi-precious jewels, silks and other Asiatic products, but in that year, cloth merchants of Venice originated a gold coin which they named a ducat, from ducatus or duchy. This word appeared on the coin, thus giving it its name. This coin soon became a standard for foreign exchange because it contained "portable metallic value" in the form of gold content. By manipulating the circulation of the ducat, Venetian bankers were almost able to create a monopoly of trade money, and thus this Venetian monetary unit became a powerful agent in deals for European raw wool.

The last visit of a Venetian galley to England was recorded in 1532. From that time on, there seems to have been no organized Venetian trade in English raw wool, but while it lasted, it was extremely profitable for both parties. A record, dated 1440, shows that a merchant of Venice purchased one hundred bales of raw wool from various English monasteries and abbeys for approximately fifteen hundred dollars. Another record reveals purchase of forty large sacks of wool for approximately two thousand dollars and that the total trading operations, based on a single, loaded galley on its two-way voyage, amounted to approximately five thousand dollars—a small return for a risky sea journey in a small, hand-rowed boat.

An example of medieval financing was the first European bank called "The Chamber of Loans," which was established at Venice in 1150. Considerably later, branches of this institution operated in London on a thoroughfare that even today is called Lombard Street and is still a banking center. The earliest record of a bank organized to receive deposits for the purpose of financing trade also appears at Venice. As early as 1270 the first banking law on record was enacted to protect depositors, and from this act, it at once becomes clear that even between 1270 and 1318 merchants of Venice were developing into international bankers. In 1587 these merchant-operated banks launched the first public banks in Europe to deal in foreign exchange in almost every industrial city in Europe.

Christopher Columbus, a native of Genoa, came from a family of local cloth weavers. His father, Domenico, and the immediate family of his mother, all were cloth weavers. As late as 1472 both Columbus and his father were employed as wool weavers at Savona, a small town near Genoa, the son having followed this trade from the time he was twelve years of age. In 1473 Columbus had saved enough capital to purchase an interest in a local wool company, and as a buyer of wool and seller of finished woolen cloth, he made several voyages by sea, possibly to Spain, for the activity of almost every Italian cloth merchant was closely related to the sea.

# WOOL IN SPAIN

NO PEOPLE OF MEDIEVAL TIMES contributed as much to perfecting the fleece of European sheep as did the wandering, conquering Arabs, who settled in Spain for over seven hundred years, and whose ancestors had learned about wool and woolen cloth from the master craftsmen of Mesopotamia.

The earliest records of Spain mention woolen cloth, for we know that about 1000 B.C. Phoenicians carried on a thriving trade in raw wool and that through the port of Cadiz they collected their finest woolen cloth from the ancient districts of Sagunto and Jativa. With the advent of the Romans, however, Spanish records become more specific. During the era of Caesar Augustus, 31 B.C. to 14 A.D., the Romans imported, from Catalona, a large quantity of Spanish-woven woolen cloth, dyed red, and converted this fabric into official robes. Export of woolen cloth from Spain to Rome involved but little effort or transportation cost, for Catalona was a neighboring town to Barcelona which had been an important seaport since the time of the Phoenicians. The quality of woolen cloth woven at Catalona was so excellent that it long survived the collapse of the Roman Empire and was quite extensively dealt in by Italian cloth merchants who, however, discontinued this trade when the Iberian Peninsula was invaded by their enemies, the "Eastern people," and trade between Spain and Italy was suspended for almost eight centuries.

From these and other records we know that the art of making woolen cloth was practiced in Spain long before the invasion of the Saracens in the 8th century. Incidentally, some historians called the invaders "Moors," but this is not exact, for only a portion of the conquering army was recruited in Morocco, a name derived from "Mauri," the Roman designation for natives of Mauritania, now called Morocco.

Although warlike by tradition, the Saracens followed many of the arts of peace as understood in Arabia and the Near East. After the death of Mohammed in the 7th century, they took immediate steps to forge an empire which, geographically at least, ultimately exceeded the Roman Empire, even at its zenith, in size. Moreover, they accomplished it in one-tenth the time required by the Romans to acquire their empire. In 711 A.D., a segment of these Eastern people reached Europe by crossing the Straits of Gibralter and within the following two years had penetrated the Iberian Peninsula to a point near the site of Poitiers in France.

Prior to this invasion, the sheep of Spain appear to have been neglected since the departure of Roman troops, but these wool-wise Eastern people, who were destined to make Spain their home for over seven hundred years, introduced superior breeds of North African sheep and greatly improved the quality of fleece. Also, at various places, they established colonies of wool workers and woolen-cloth weavers and pretty generally fostered their ancestral textile activity, by introducing practical principles in cloth manufacturing. Even in those uncertain times, these Eastern people made a real contribution to the wealth of the land they had conquered, and just how far they would have developed both raw fleece and finished woolen cloth, had they not been harassed by almost continuous fighting, is, of course, pure conjecture. These industrious Easterners traded in raw wool and woolen cloth at all ports along the Mediterranean Sea and even interested cultured Constantinople in their woven fabrics. They also fabricated sail cloth which was in great demand at Barcelona and other Western Mediterranean ports. A large volume of surplus Spanish raw wool was shipped to Flanders and, as early as the 12th century, to England. It was assured a ready market in both of these experienced textile countries. This is proof enough that Spanish wool was equal, if not superior, to other types of European wool. In fact, in England especially, the extraordinary fineness of Spanish wool was always a thing of envy.

It was largely due to their skill in the various phases of wool craftsmanship and, in some measure, to an Oriental trade shrewdness, that these alien people were able to maintain their sovereignty over the finest provinces of Spain for over seven hundred years. Under the rule of the Saracens, Spain had become not only a great sheep-raising country, but also a woolen-cloth-manufacturing nation, producing textiles of great volume and value. In the 13th century, there were over 16,000 weaving looms of varying sizes in the town of Seville, and production of woolen cloth at Catalona was so great that it led the way to close commercial relations with Egypt, Greece, Byzantium and many prosperous cities of North Africa. In the 14th century, the fine woolen cloth of Barcelona was acclaimed for its excellence. In fact, woolen cloth from certain Spanish workshops appears to have been considered costly enough to serve as a present for foreign princes, for a quantity of Spanish woven and decorated woolen cloth was sent by the Spanish sovereign to the sultan of Turkey. During these two centuries of Spanish manufacture of woolen cloth, weavers also doubled as cloth merchants, and some Catalona weavers actually owned the vessels which transported their products to distant markets. Spain was also sending its textile products to France and even Flanders, the cloth center of Europe. Late in the 14th century Spanish cloth weaving received fresh impetus through the marriage of Henry III of Castile to Catherine, princess of England, and in the dowry of the princess was a flock of English sheep. According to unsubstantiated English tradition, the famous merino sheep of Spain are descended from this flock.

Late in the 15th century, a combination of two Spanish monarchs drove the Saracens, or Moors, as they were then called, out of the country they had so greatly enriched, and thereby Spain lost her opportunity for textile supremacy. Soon it was necessary to import woolen cloth from Flanders, for all manufacturing was abandoned. The first step was taken by Ferdinand V, when he banished one hundred thousand woolen-cloth weavers solely because of their Saracenic origin. The second, and final, step was made in 1490 by Philip III, who "in an endeavor to drive all heathen from the country," banished seven hundred thousand aliens, all engaged in some phase of woolen-cloth manufacturing. Soon the Spanish woolen industry practically disappeared, and many times since that fateful error, Spain has unsuccessfully attempted to revive her once prosperous woolen industry. Sheep husbandry, however, called for no skilled labor, so it was continued, and Spanish fleece still held its position as the finest in the world. Of all European countries, Spain has consistently paid the most attention to breeding desirable sheep by introducing different blood strains from countries accessible to their sheep husbandmen who have never forgotten the old Spanish proverb "wherever the foot of sheep trod, pastures turn to gold."

Discovery of the Western World by Columbus and of an all-water route to India by de Gama resulted, somewhat, in the lessening of Spanish textile activity. With an influx of gold and raw materials from many sources, the Spanish people became less willing to pursue arduous work in fields and textile mills, and this loss of men trained in sheep breeding produced a marked depreciation in Spanish wool. Although it was estimated at that time that the number of Spanish sheep was several million, yet the finer wool used was imported from Silesia, Saxony and England. Spain never recovered her market for woolen cloth, and due to heavy taxes needed for colonial expansion, it required at least two centuries to restore Spanish wool to its position of primacy.

During the ups and downs of the Spanish wool and cloth production, exportation of merino sheep from Spain was always closely guarded, no one being permitted, under penalty of death, to take or send a merino sheep out of the country. As rare concessions to this rigid rule the Spanish Government, on a few occasions, relaxed its embargo and presented small flocks of merino sheep to a friendly sovereign, or to a government official, as recognition of past favors or those to come. As most European royalty was, in some degree or other, related to the Spanish monarchs, they frequently urged a present of a few merino sheep, often with no result but embarrassment, for even on these occasions every effort was made to prevent sending merino sheep to a foreign State that might, in time, become a competitor. Disappointed royalty, however, often forced their agents to smuggle sheep through Portuguese seaports.

Special precautions were taken to prevent merino sheep from reaching France because that country, more than any other, was looked upon by Spain as a potential competitor. Although from time to time during summer migrations, stray Spanish sheep may have wandered up to the border mountain-side and strayed into France, where they were promptly confiscated for trespassing, yet no considerable number was lost in this manner. While waiting to invade Spain, the army of Napoleon waited for migrating flocks of merino sheep to arrive on the Spanish side of the border mountains and then would send details of forage soldiers to drive sheep into nearby French territory. It is reported that, in some of these operations, more than two hundred thousand sheep were lost to Spain. In 1808 in anticipation of an actual Napoleonic invasion, the king of Spain sold two thousand of the finest merino sheep to English sheep breeders, and various other European countries were able to import merino sheep from Spain and subsequently used them for cross-breeding with sturdy native stock. Because of these and other dispersals of Spanish merino sheep in the 19th century, a considerable number left that country, laying the ground-work for a world-wide merino wool industry.

## WOOL IN FRANCE

WOOLEN CLOTH had been woven in France for over one thousand years prior to the arrival of Roman armies, but textile activity had not developed beyond a domestic phase of producing a coarse woolen garment, quite crude in texture and entirely undecorated. However, it was these early natives who called the cloth a "garment" from the word "garnir" which meant to protect, as heretofore they had merely decorated their bodies with dyes and stains. During the Roman occupation of Gaul, the Romans ordered native weavers to supply sixty thousand woolen blankets for their army of occupation, and Imperial woolen factories were established at many places. One of the most important was at Telo, the modern city of Toulon, at which place were fabricated woolen capes and hoods "of great thickness and durability" that found favor not only with the Roman army, but with Roman citizens as well. So popular were these capes and hoods that demand for them did not cease until after the collapse of the Roman Empire. The wool craftsmen of ancient Gaul also devised a fabric of linen and wool which the Romans called "sagum." This cloth was also popular in Britain, and, when in the 13th century, it was used by Robin Hood, it had acquired the modern name of serge. An ancient historian informs us that the Gauls wore the best clothes of all the Cisalpine tribes conquered by the Romans.

The Frankish invaders of Gaul, or, modern France, did not attempt to destroy a textile industry which had served a previous invader, the Romans, so well. Upon returning to Rome after escaping from the Franks, a refugee citizen of the Empire is recorded as reporting that the Gauls "did not abandon the use of good cloth, nor did they forget how to make it." Nevertheless, the people of medieval Europe had little other than homemade clothes because, after the fall of Rome in 476 A.D., all trade practically ceased. Production of woolen cloth, however, was encouraged by Charlemagne who became king of France in 768 A.D. It was he who established at Lyons and Rouen what are today the oldest textile markets in France. He also organized spinning schools on "his estates" where all the processes of woolen manufacture were practiced and where spun wool was made into clothing. English wool was generally used when its exportation from that country was permitted, and so highly did Charlemagne value it that he, personally, exempted wool merchants from "peril of capture by war," which in those days was apt to break out any time, anywhere. In the forty-third "Chapter of Instructions" concerning administration of his kingdom, which included not only France, but Flanders as well as some parts of Germany, he decreed that not only wool and flax, but also certain vegetable dyes should be produced. Another edict established the port of Hamburg, in 804 A.D., as a northern seaport for his commerce.

In the early years of the 9th century, after Charlemagne had ruled for about four decades, Eginhard, his secretary and biographer, tells of an exchange of gifts between that great Western monarch and the famed Haroun al Raschid (Aaron the Just) of Bagdad, who as "the most elegant Caliph in the world" was the hero of many tales recorded in "Arabian Nights." Eginhard relates that Charlemagne sent Haroun "some exquisite checked, striped and flowered woolen cloth made in Frankish cloth factories" of Flanders, and that the famous caliph responded with silken garments, perfumes and spices. The Gallic cloth doubtless seemed crude to the ruler of Bagdad whose royal weavers worked for a State monopoly and used only the finest Chinese raw silk, but criticism was silenced by political strategy. These two great emperors were supreme in world affairs. Charlemagne sought to enlist the aid of Haroun in event of attack on his eastern frontier by Byzantium, while Haroun was equally desirous of potential aid in event of any uprising by the Seljuk Turks who were growing too independent to "take orders." These two monarchs differed in everything but power, for Charlemagne and many of his nobles were learning how to write while Haroun with the help of scholars attached to his Court was studying Aristotle, and the campaigns of Alexander the Great, in the original Greek text.

During and after the reign of Charlemagne, France continued active in its woolen-cloth industry, until the Dark Ages settled on Europe, when trade almost ceased. Practically the only French industry that was at all active was the manufacture of coarse woolen cloth from North Africa, Barbary wool. The town of Langueboc became well known for this type of cloth. Between the 8th and the 10th centuries, women, who lived in cottages clustered around a feudal castle, did most of the weaving of wool into the coarse cloth that was worn by the common people of that period. Poor people usually wore only a single garment for both work and sleep, discarding it only when it became worn out. From about the year 800 to 1200, both men and women of France and contiguous countries wore a single, long, woolen garment held in place at the waist by a girdle. Gradually women shaped dresses to their natural form, while men shortened their outer robes, and wore woolen trunk hose.

Workers who had managed to accumulate articles of barter value could obtain more serviceable woolen cloth at cloth fairs held throughout Western Europe. These fairs were first instituted by Charlemagne to raise funds for the Church of St. Denis, at Paris. These typically French barter events were usually held in October of each year after the crops had been harvested and were annual events from the 8th to the 13th century. Much of the woolen cloth sold at these cloth fairs was made from wool imported from England and woven into cloth at rural abbeys and monasteries which, during the Dark Ages and for some time thereafter, were about the only schools in rural districts of France. Women of noble birth also learned to spin and weave woolen cloth from both local wool and the famous "Monastery wool" of England.

Some of these amateur weavers fabricated tapestries for the bare stone walls of churches and castles. These depicted favored episodes in the lives of saints, and less often, of national heroes. The most famous tapestry that has survived to the present time, is known as the Bayeux tapestry, which really is needlework and not an example of actual tapestry weaving. This celebrated textile piece was of linen cloth worked in wool and was over two hundred feet long but only twenty inches wide, which suggests that it was originally intended for display around a cathedral wall, and this is confirmed by the knowledge that it was prepared for presentation to the cathedral at Bayeux where the brother of William the Conqueror, as bishop, had his official seat. The story it depicts begins in 1065, one year prior to the time that William and his loyal followers sailed for England, and ends with his successful conquest of that country in 1066. It is thought to have been the handiwork of William's wife, Queen Mathilde, and ladies of her Court. An interesting incident of William's expedition was that he was accompanied by a number of wool weavers whose ancestors had been driven from England in the 5th century by marauding bands of Saxons.

Only with the greatest difficulty were Spanish merino sheep imported into France during the reign of Louis XIV, and subsequent cross-breeding resulted in a French type of merino sheep which was one of the best long-wool breeds in Europe. For some reason or other, this promising project was abandoned. It would seem logical that France, which, as Gaul, had been one of the important Roman colonies producing various forms of woolen goods from a time prior to the Christian Era and had continued production all through the reign of Charlemagne, would have expanded the production of raw wool and woolen cloth to the point of at least competing with other wool-growing and processing countries like Spain, if not dominating the European woolen market, as did, in succession, both Flanders and England. Contemporary writers, however, tell us that "France was too much concerned with greater attention to silk," and thus production of woolen cloth became a minor activity until, under Richelieu and Colbert, two great ministers of State, France made some progress in woolen-cloth production as part of a general economic program. France was better situated for Mediterranean and Eastern trade in woolen goods than were either England or Flanders, and in an effort to attain some degree of importance in the East, France at least took pains to improve the fleece of her flocks.

This process was disturbed when, in 1685, the Edict of Nantes was revoked, and religious persecution forced large groups of Protestant textile workers to flee to more hospitable shores where it was possible to enjoy religious free-

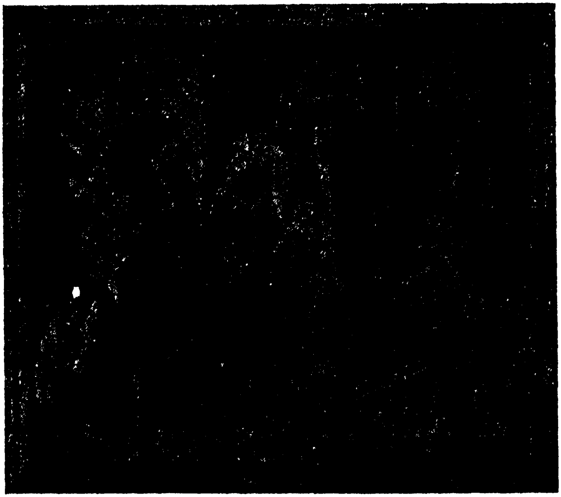

FIGURE 2

Medieval Mat Weaving
(Reprinted by permission of *The Melliand*)

dom and to work in personal safety. In those lands they established, if not a new woolen industry, at least new techniques for cloth merchants with whom they had formerly been in competition. They hastened their departure from France when the short-sighted ban on free emigration of French Protestants was proclaimed, and a growing French woolen industry was all but wrecked, for a majority of all textile workers in that country at that time were Protestants. Estienne in his "Apologie d'Herodade" says that originally the Huguenots were Protestants of Tours, both Lutheran and Presbyterian, who made it a practice to "assemble at night near the Gate of St. Hugo, whom these people regard as a spirit." A chance phrase of an obscure monk made the name "Huguenot" historic. It is recorded that this unknown cleric declared in a sermon: "These Lutherans ought to be called Huguenots, as kinsmen of King Hugo, inasmuch as they would go out at night, as did he." Perhaps the monk did not recall the fact that the people he was criticizing toiled all day, often from sunup to as late as seven in the evening. From the year 1560, the name Huguenot became synonymous with French Protestants who, prior to its revocation, had been protected for over a century in both religious and civil liberties by the Edict of Nantes. Its revocation has been called "one of the most flagrant blunders in the history of France." In every country where these refugees found a safe haven they seem to have permanently settled, for the heartless action of France towards its Protestant citizens killed any desire of an oppressed minority to ever again reside in that country.

France made its final entry into European wool growing in 1786 when Louis XVI brought a flock of 380 Spanish merino ewes and their lambs to the royal estate at Rambouillet, near Paris where the king had established an experimental farm. These sheep prospered so well that in 1799 another flock of 237 merino sheep was imported, but subsequent cross-breeding had only a temporary influence on the quality of French wool, for the woolen-cloth industry, itself, was gradually being abandoned as a nation-wide activity.

# WOOL IN FLANDERS

FLANDERS WAS A COUNTRY which Caesar described unfavorably in his history of the Gallic Wars. However, the various tribes he encountered there were already skilled in spinning and weaving, and it is quite probable that knowledge of these crafts and of other civilized activities can be attributed to the Phoenicians who had often visited the Flemish coast long before the Christian Era. When the Romans, who colonized the delta of the Rhine and Meuse rivers, later called the Low Countries, were forced to retire in the 5th century, one of the warlike Teutonic tribes, called Frisians, developed into efficient traders in woolen cloth and eventually expanded their activities to France, England and Scandinavia. Eventually they became a part of the empire of Charlemagne, who was especially interested in promoting their cloth industry. After the collapse of the Roman empire reappearance of woolen-cloth weaving in Western Europe was largely due to these Flemings, or "weavers" as the word literally means, for they were the first people in Western Europe to earn their living by weaving.

As conditions became favorable for trading with other countries, Flanders became the important woolen-cloth distributor of Europe. Accessible by sea and strategically situated between producing Latin nations on the south and southeast and less productive Teutonic nations of Northern and Western Europe, Flanders appeared in trade records as early as the 7th century. Under the "Regnum Francorum" or rule of Charlemagne, civil order finally emerged after the two hundred years of chaos which followed the collapse of the Roman Empire. Almost immediately, the traditional woolen-cloth activity of Flanders again got under way. Flemish cloth merchants bought raw wool wherever they could get it and sold finished woolen cloth, fabricated either in private cottages or at monasteries, in all nearby markets long before Florentine and Venetian merchant-bankers appeared in that part of Europe.

In common with many other countries of Middle and Western Europe during the Dark Ages, wool spinning and woolen-cloth weaving in Flanders were mainly carried on in monastery workshops by local monks, who at first fabricated woolen cloth solely for use in their religious houses. These cloistered men were the heirs of the weaving technique of the ancient inhabitants of the country and, for many decades, were the sole source of woolen cloth, except for the small volume woven in private homes for family consumption. However, this monastery cloth was favorably known even before the rise of Flemish cities in the 9th century.

The prosperity of a score of Flemish cities, which were mainly founded in the early Middle Ages, was largely due to activity in textile production, by which means a majority of Flemish citizens earned their livelihood, and which for nearly eight hundred years brought wealth and power to their country.

Unlike many older towns in other parts of Europe, the cities of Flanders were not of Roman origin as military outposts of a great empire. They developed in cadence with an expanding textile trade of the country as a whole. As early as the 9th century, cloth buyers of England, France and Italy sailed the navigable rivers of Flanders and purchased the already well-known "Frisian cloaks," as Flemish cloth was then called. Attracted by textile possibilities unequaled elsewhere in Europe at that time, many of these foreigners elected to remain in Flanders, to be instructed in the textile crafts, and some even decided to permanently settle in that country, for the Flemish woolen-cloth industry had developed so rapidly that skilled weavers of wool were always in great demand. An old Flemish chronicle states that after the citizens had fortified several of their towns, they "invited into their country all manner of cloth craftsmen," and from this period the manufacture of Flemish woolen cloth made rapid advance. It was in this manner that Ypres, Bruges, Ghent and other medieval Flemish cities were expanded, and some even were founded. These closely integrated towns, so convenient to reach by sea and river, offered world distribution advantages much more attractive to traders than did any other European port, and therefore these Flemish cities prospered in proportion to their use.

When transportation by land became more highly developed, it also provided an expansion of potential cloth-consuming markets, and one result of this condition was that the previous volume of domestic raw wool became inadequate. One reason for this was that, with the expansion of the Flemish woolen industry, such a large number of people was drawn from agricultural areas to engage in textile activities that it was not possible to maintain even the usual number of local sheep. Search for new sources of raw material should logically have led to either France or Germany, for delivery of fleece did not involve shipment by water. However, this was not so because, in addition to the warlike proclivities of these neighboring countries, sacks of wool proved too bulky to be transported at reasonable cost over rough roads of a semi-occupied territory. Moreover, English shipowners were glad to profit by transporting raw wool almost to the doors of cloth merchants in the various towns, and this arrangement was attractive.

So, financed by Italian merchant-bankers as early as the 10th century, great quantities of raw wool to be used by Flemish cloth weavers were imported from England and Spain, with a small amount of coarser wool coming from Scotland. Only in the very early phases of the economic system of Europe, was the bulk of wool spun and woven into cloth in the same locality where sheep raising flourished. The terrain of Flanders was very well suited to sheep grazing, but Flemish husbandmen of that era were not too well versed in the science of sheep breeding. Moreover, it soon became evident that wool from England and Spain was silkier, softer and longer than any that could be raised in Flanders. At that time England had no permanent outlet for surplus wool, so she gladly sold it to Flemish cloth merchants who, very early, formed a combination of cloth merchant guilds representing several of the largest Flemish cities and acquired exclusive rights to trade in English wool. This arrangement continued for about three hundred years.

One of the most surprising phases of the Flemish cloth trade is that, at its beginning, it was a luxury industry. Cloth for daily use was everywhere fabricated in small self-sufficient, local, cloth-producing towns. Cloth for dress fabrics, during most of the Middle Ages, was coarse. The poorer classes even used cheap grades of hair and hemp fibers. From prince and prelate, however, there gradually arose demands for fine woolen cloth, and when, in the 10th century, this demand became more widespread, the woolen cloth of Flanders achieved renown and found markets to an extent unequaled in medieval times. One reason for this favorable attitude was the specialization of various processes in cloth making. As early as the 12th century, weaving became a recognized industry as distinct from spinning, and Flemish weavers adopted a standard measure for woolen cloth which had been suggested by Henry I of England, who defined one yard as the length of his arm. Being close to France either by land or water, Flanders "sold woolen cloth to that fruitful land where the inhabitants were not only able to feed themselves, but could put themselves in good apparel." Woolen products of these expert Flemish weavers also found great favor in England where they were exchanged for raw wool and other English products, and it is recorded that the fabrics of Flanders were sold not only to Mediterranean countries, but even as far-away as cities on the Volga River.

All this trade in woolen cloth brought great prosperity to the cloth merchants of Flanders for, during the 10th and 11th centuries, Flanders had attained such perfection in woolen craft that it was said "all Europe is clothed with wool wove in Flanders." When Count Baldwin III induced Eastern weavers to settle at Ghent in his duchy of Flanders, that country reinforced its position as the textile center of Europe. Even the use of antiquated manufacturing methods, like fulling cloth by stamping it with the feet and by employing dyeing practices known, even in those days, to have been primitive, resulted in such gorgeous fabrics as garments worn by the courts of both France and England, for which "no price was too high because no garment can surpass them." Some of the finest European textiles were being produced by Flemish textile craftsmen. The quality of Flemish cloth caused it to be exported to the Orient where it was exhibited in local bazaars, alongside of brocades, damasks and other Oriental fabrics. Among the presents sent by the king of Aragon to the ruler of Babylon, in 1322, were costly woolens of Douai. Even princes, who were actually at war with Flanders, could not get along without that country's fine textiles, and they, like Philip the Fair of France (1285–1314) who occasionally declared a boycott on Flemish woolens, secured woolen cloth for personal use through subsidized smugglers.

About 961 A.D., the cities of Ghent, Ypres, Bruges and other less prominent cloth centers shrewdly adopted an Oriental custom and were the first people in Western Europe to organize indoor "cloth halls" which were held all year. About eighty years later, outdoor cloth fairs were organized. These permanent and semi-permanent city-centered exhibitions of cloth were soon copied all over Europe and through them the woolen fabrics of Flanders found a hitherto unexplored market among a growing class of prosperous merchants and minor civil servants, for fine Flemish woolen garments had become symbols of refinement in the towns and cities of Southern and Western Europe.

In time, these cloth fairs attracted foreigners, for they were channels through which woolen-cloth merchants from various Italian cities purchased raw wool and partly finished woolen cloth. The principal Flemish trading center for English raw wool was Bruges, which in 1334 was the sole raw wool center in the Continent. As early as 1392, there was a "Florentine Street" which was a group of stalls to which the restricted business activities of these merchants from Florence were isolated. Inn-keepers of many Flemish cities were compelled to pay a sum of money to their city administration, as a guarantee that they would make certain that foreign merchants lodging with them did not leave town without paying for the cloth they had purchased.

Also at that time it was common practice to suspect all foreigners of political intrigue. So they were closely watched by their landlord, who, for this service, received "werdeghelt" or a commission which varied according to the value of purchases made in the local market.

As long as commerce moved along road and river, cloth fairs were centers of trade. Foreign merchants purchased Flemish woolen cloth chiefly at cloth fairs held at Bruges, Ypres and Douai, while cloth merchants of North Flanders disposed of their product at cloth fairs held in the Rhenish provinces. As overseas trade increased in the 13th century, the importance of cloth fairs began to decline all over Western Europe.

The so-called cloth fair cities of Flanders were actually no larger than a present-day, prosperous, mid-western city. Bruges, the seat of powerful woolen-cloth merchants and one of the wealthiest cities of its day, numbered only 40,000 people, but it was a larger port than Venice. Ghent, which until the victory of Charles V of Spain was the most populous city in Flanders, numbered but 50,000 people. Likewise, Ypres, Douai and other cloth centers counted their populations in but a score or two thousands, but the very fact that they were comparatively small, accounts for the intensity of industrial life within their borders. All of the Flemish cities were the most democratic in Europe.

Ypres, the ancient capital of Western Flanders which, as early as 960 A.D., was founded by woolen-cloth workers and was long a center of that industry, became one of the most important cloth-manufacturing cities in Western Europe and in the early 15th century was larger and of more world importance than London. Bruges, founded by Charlemagne in 760 A.D., was also busily engaged in manufacturing woolen cloth, and while in 1385, six hundred years later, it was hailed as "the center of all commerce in Chistendom," yet it could, at least, modestly claim to be the wool capital of Europe during the Middle Ages.

Historians of the textile industry agree that worsted cloth made its first European appearance in Flanders, but they do not with any certainty know where it was first manufactured. It is quite probable that cloth of this type was anciently woven at some point in the Near East, and that knowledge of it was brought to Europe either by Armenian merchants or by Crusaders returning home from the Holy Land. The demand for worsted goods throughout the Levant would seem to confirm this conception of its origin. But when the art of spinning and weaving worsted yarn became known in Western Europe, it was in Flanders that active merchandising of worsted cloth was most prevalent, and Flanders kept this market until, several centuries later, it passed to England. For a long time previous to this event, however, there had been a textile association between the two countries. It was not until Flemish weavers and fullers had introduced their methods into England that cloth produced on English looms was able to compete in world markets. English wool and Flemish textile craftsmanship remained, for centuries, the recognized combination for first-class woolen cloth whether made in Flanders from imported English wool, or fabricated in England by Flemish cloth weavers.

The superiority of Flemish woolen cloth over similar cloth made in England, especially until the 15th century, lay in the fact that although, as in England, Flemish cloth was made in rural areas where it was difficult to formulate rules to govern its quality, yet in 1351 a Flemish decree prohibited the manufacture of woolen cloth for sale beyond a distance of three miles from any city or town. Thus, it was possible to enforce measures necessary for raising the standard of woolen cloth offered for sale to the public, as it had to meet the approval of three jurors appointed by local authorities who examined all cloth to be sold either at home or abroad. Moreover, woolen cloth produced in many Flemish cities bore the seal of the city in which it was produced, and it was long thought that the good name of any city depended upon the quality of cloth it produced.

Modern trade marks and also the labels found on clothing are evolutions of the compulsory regulatory marks of medieval times. In the early days, each woolen-cloth worker was compelled by statute to affix his mark so that, through this identification, defective work, short weight or inferior material could be traced to its source, and other workers in that area could be protected. It also meant that if, for instance, woolen cloth, bearing the trade mark of a Flemish cloth maker, was offered for sale in some other country, the merchants of that district had justification for action, since in most countries in those times the sale of foreign cloth was forbidden. Each individual cloth maker had a distinctive mark which was registered both on the records of his city and on the books of his guild. At first these marks were a simple design stitched into the cloth, but later they grew into almost heraldic devices, as the result of efforts to impress customers.

Municipal cloth weaving was predominant in Flanders and was long a basis for the livelihood of the citizens. It is not surprising to learn that city-trained cloth weavers vigorously opposed cloth weavers of rural areas, who offered stiff competition in prices if not in quality of product.

From the 14th century on, Flemish peasants copied, as far as possible, the famous woven woolen cloth of the cities but never equaled the quality of the city weaving. Organized city textile craftsmen did all they could to suppress this annoying competition and even sent armed men to burn rural looms and such raw material and finished cloth as they could find. The angered peasants, worried by a blockade of English raw wool, countered by purchasing Spanish wool and began production of light, cheap, woolen cloth.

Weakened by growing English competition in unfinished woolen and worsted cloth, city weavers began to lose their favorable trade position, and even with second rate cloth, rural weavers began to conquer the world-market of that era. Like the monasteries of the early medieval period, the cloth-making cities of Flanders were forced to be content with greatly reduced sales volume and eventually with a strictly local market. But even the remarkable rise of rural cloth weaving came to an end when the religious persecution of the 16th century drove textile craftsmen from their native land. By order of the Spanish invader, Philip II, the sack of Antwerp by his regent, the Duke of Alba, and the invasion of Flanders in 1585 by the armies of the Duke of Parma who looted and devastated not only Antwerp, but also Bruges and Ypres, drove many thousands of skilled workers in wool to settle permanently in Northern Ireland, France and England. In the latter country, Queen Elizabeth granted Flemish weavers permission to establish in that country a woolen-cloth industry similar to that of rural Flanders, but this industry disappeared after a shadowy existence of about one hundred years.

The meeting place, where woolen cloth merchants fixed current prices for their goods, was originally known by different names in various cities of Flanders, but about the

16th century the name of "bourse" became the universal name for such a meeting place. This name originated at Bruges where, at one time, local cloth merchants met at the home of a local nobleman named Van der Barse.

# MONASTERY WOOL

Soon after the Roman army of occupation withdrew from England, evangelizing monks erected monasteries and abbeys, and ultimately became the great shepherds of England. An ancient record said of them "wherever they went, the monks brought magic to the hills and fields of England." The first such monastery is believed to have been built in 560 A.D., and from the 6th century to the middle of the 14th, the monasteries and abbeys of England were the principal producers of raw wool and were one of the most important sales outlets for that commodity. Huge flocks of sheep were maintained at many of the abbeys. In 1270 the abbey at Meaux possessed over eleven thousand sheep, and in 1309 the abbey at Crowland owned nearly nine thousand sheep. Fleece from these flocks was eagerly purchased by Continental buyers who made it a practice to attend the annual cloth fair at Winchester and later other English cloth fairs, as they were established.

For nearly one thousand years, English monasteries and abbeys, especially those of the Cistercian Order, played even a larger part in supplying raw wool for both domestic and foreign cloth manufacturers, than did individual farmers. These religious houses were usually built in rural districts ideal for pastoral activities on a large scale, and the Cistercian Order of gray and white monks was dedicated to service through agriculture, also maintaining large acreages in both Spain and Scotland which were almost exclusively devoted to sheep raising. These monasteries and abbeys were not only hospitable resting places for travelers but

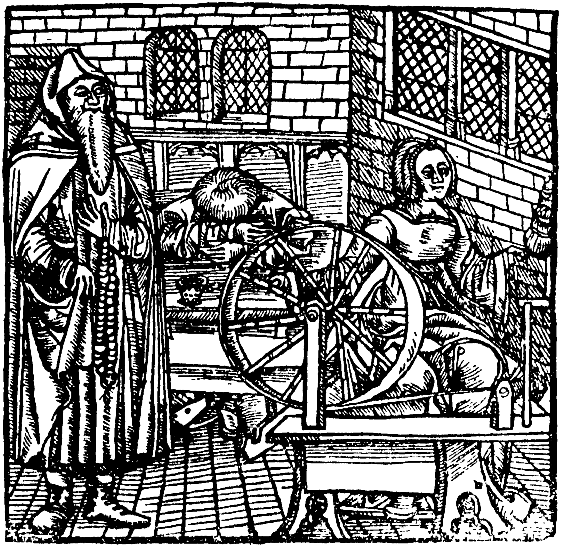

FIGURE 3

Monastery Spinning
(Reprinted by permission of *The Melliand*)

also were important centers of early and medieval production of excellent woolen cloth, much of which was originally woven for use by members of the Order in various communities. Rules of the Benedictine Order obliged its monks to devote a certain number of hours each week-day to handwork, and consequently the weaving of woolen cloth is very old in England. We are told that through the monks at Bath Abbey the weaving of wool was brought to such perfection "as rendered the city one of the most considerable after the weaving of woolen cloth made its appearance in England." The woven woolen cloth of Worcester was so excellent that, by order of the Benedictine Chapter held at Westminster Abbey, it was forbidden to be worn by Benedictine monks and was declared good enough for military men. Henry II, who reigned from 1154 to 1189, endeavored to assist in the progress of this craft and, following a Continental custom, inaugurated the first English cloth fair in the parish yard of a London church, thus placing the craft under the patronage of the Church.

In the days of King John, 1167 to 1216, from whom the angry barons exacted the Magna Charta, some sort of crude wool dyeing was undoubtedly being carried on, for in a manuscript by St. Andemai dated about 1300 mention is made of pieces of woolen cloth, which had been dyed purple and red and used for ecclesiastical ritual. Undoubtedly, this reference is made to woolen cloth made in a monastery and colored with some dye of native vegetable origin, for the standardization of colors from various local and foreign sources did not occur in England until the 15th century. In St. Andemai's time, the English textile industry was still under Roman influence, and there had been an influx of wool dye merchants from the Continent, one group settling at Glastonbury Abbey where two dye houses had been prepared for their use in the monastery attached to the abbey. Monks attached to the abbey advanced the necessary amount of raw wool to purchase dyes, a procedure practiced by several other medieval English monasteries.

The will of the Earl of Salisbury, a natural son of Henry II, dated about 1215 devises as a contribution towards building a monastery, "one thousand sheep and three hundred muttons." Presumably, the former were bred for wool, and the latter for meat. In an inventory of property belonging to a priority in 1337, is an item "there are in store one hundred forty muttons, each worth ten pence, and one hundred sheep worth eight pence."

As early as the 13th century English convent "needle workers" wrought great ecclesiastical pieces in both wool and linen, and these nuns also served their neighborhoods by teaching town and farm women how to spin and weave. In fact, after the dissolution of English religious houses, the wool industry was without its centuries-old centers, but often in return for domicile, scattered nuns of various Orders repaid their protectors by teaching wool spinning and weaving. Thus was planted in many families a household art that came to its full value when English woolen cloth weaving reached into almost every home.

From the 6th to the 14th century, the principal raw wool producers in England were the monasteries and abbeys. A document dated 1285 states that in 1274 a Florentine banking house made generous advances in money to a few English religious houses in return for the entire raw wool crop. At that time no monastery had the liquid capital which it needed, among other things, to erect storage sheds to properly protect wool awaiting shipment, especially during the reign of Edward I, or "Longshanks," from 1272 to 1307. These Florentine merchants were the most important sales outlet for English monastery wool produced in sufficient volume to interest them, and when these monasteries and abbeys were located, the merchants often won friendship by donating expensive altars and exquisite furnishings for monastery and convent chapels. They soon sent representatives to England to estimate the volume of wool that could be expected each year from the two hundred religious houses in both England and Scotland with which they dealt and to agree upon a purchase price, often for many years in the future. Some of these monastery-banker contracts are believed to have run for from six to twelve years into the future, for the Florentines looked upon monastery wool as the equal of Spanish wool, and it had the advantage of being much cheaper.

The shrewdness of these Florentine merchants is proven by the fact that the influential position these medieval business men occupied in English economy for so many years could not have been attained had they operated merely as buyers of wool, as did their Flemish competitors, and not also as bankers. The stability of the gold florin of the Tuscan city of Florence made it the most important monetary unit in international trade of about seven hundred years ago, and therefore future delivery contracts with the merchants of Florence were attractive. Incidentally, the Florentine florin was the first coin that a city was ever authorized to circulate, as coinage had always been the sole prerogative of kings and emperors.

The many and often involved financial activities of the Florentine banker-merchants were reported to have had the blessings of the Papacy for whom, from about 1219, they had, in varying degrees, acted as fiscal agents. By careful management of intricate financial affairs, they had attracted the notice of various Popes and had often collected Papal revenue, being entrusted by a number of Popes with the collection of tithes and other funds due the Church, often accepting payment for these debts in raw wool. Soon these Florentine merchant-bankers were able to appear as Papal emissaries and, through this official relation, reached the king and the more influential nobles to whom they loaned money in large amounts. Because of these loans to a succession of English kings and important statesmen, the Florentines received trade privileges of great value, especially in their purchase of raw wool at the various English monasteries and abbeys.

A typical loan of that period was one hundred and twenty-five thousand dollars in modern currency, made in 1250 to Henry III, which was to run for two years, and in event of default, the monarch agreed to pay 60% interest and assign for the Crown treasury a mortgage of the entire export duty on English wool until satisfaction of debt was admitted. In accordance with an edict of the Church, no interest was charged for the duration of the loan, but, in harmony with the custom of the time, the king "made a present" equal to 12% to his creditors when the loan was repaid. This, of course, defied the edict of the Church, so the Florentine merchant-bankers gradually withdrew from direct connection with exorbitant interest rates, turning this portion of their textile activity into a partnership with some local Florentine Hebrews who, not being affected by any rulings of the Church, were free to exploit the financial needs of the suppliers of raw wool and thus become the active operating banker. In this manner the Hebrews of Florence gained a foothold, which ultimately led to leadership in European finance which they held for many centuries.

Statistics dated 1272, in the last year of the long reign of Henry III, tell us of the volume of English raw wool output and the share alloted to the cloth industry of Florence. Of the thirty-three thousand sacks, each weighing about three hundred fifty English pounds, over eight thousand were shipped to Florence, and less than forty-two hundred to Flanders. In 1295 Edward I, "Longshanks," owed Florentine merchant-bankers over two million florins (about one million dollars in modern money) in gold, an enormous sum for those days, and as a result, the Florentines were fast obtaining a tight monopoly on English raw wool. This situation grew so serious that popular antagonisms developed, both on the part of English tax payers and on the part of competing buyers of wool in the various woolen-cloth centers of Europe.

When, in 1307, Edward II came to the English throne, he decided to get rid of his predecessor's creditors by force so, in 1311, under the pretext that they were about to flee from England, he confiscated all English property of the aggressive but over-expanded Florentine merchant-bankers. With great difficulty, they later left England, virtually abandoning their entire property in both goods and loans. Nevertheless, another Florentine group was permitted to enter England, for the government realized that, although monastery wool was an asset because of the wide demand for this high-quality fleece, yet in the form of raw material it was not liquid cash. Because of their ability, the later Florentine group achieved success, but because of popular demand and to regain a State monopoly of wool, such Parliamentary measures as were taken were chiefly directed at this foreign group who resisted with the energy of a large creditor. When legal protests proved of no avail, the Florentines boldly ignored government restrictions and sent many thousand sacks of English monastery wool to Florence. It has been estimated that by this action which lasted from 1313 to 1320, they deprived the English Treasury, in export taxes, of at least two million dollars in present-day exchange. Such incidents give an idea of the volume of raw wool consumed by the cloth merchants of Florence and other cloth-making Italian cities of that era.

With the advent of Edward III to the throne of England in 1327, the star of these Florentine merchant-bankers gradually began to decline, so much so that, in 1342, the king repudiated all debts owed to them, either by the State, or by individuals. This precipitate action brought about the worst financial catastrophe in the history of medieval commerce, a collapse which was all the more serious because, at the beginning of the 14th century, a great expansion in international trade had set in which could have been the basis for even larger exports of English wool. The collapse closed many of the branch banks established by the Florentines in England and also forced some of the home banks to close in the city of Florence. Fortunately, however, this did not entirely stifle the textile industry of Florence, for to meet this unusual situation many of the smaller cloth merchants of that city merged with competitors, and although in 1342, cloth-weaving companies numbered only two hundred, yet it was really an important industrial activity in a city of approximately ninety thousand, as Florence was at that time.

These large and prosperous monastic estates remained a factor in the wool industry of England until, in 1539, they were broken up by Henry VIII. The one hundred and ninety abbeys suppressed by the king housed nearly fifty thousand persons, and their united annual income was over eleven million five hundred thousand dollars. The land was distributed to court favorites who immediately enclosed their new holdings, thus adding additional millions of acres to the already vast areas withdrawn from agricultural production and increasing the number of rural people who were without work. For years English merchants had endeavored to capture the raw wool that had long flowed from these monasteries and abbeys to Italy and Flanders, and they had now succeeded. The great expansion of the woolen-trade activity which followed, occasionally turned abandoned monasteries into cloth factories as, for instance, Osney

Abbey, which in 1546 was used by as many as two thousand textile workers, and Abingdon Abbey, where Sir Thomas Cromwell's agents reported, "five hundred of the King's subjects are employed as wool weavers."

# WOOL IN ENGLAND

No PRODUCT in the history of English commerce enjoyed such remarkable prestige as did wool. It's long story has been immortalized in folk-tales and songs, but even the prosaic history of English wool and its fabrication into cloth is fascinating as well as amazing. The early textile industry of England started from modest origins, and coursed its way through ancient invasions and occupations of the home islands and through a remarkable medieval agrarian system carried on by hundreds of rural monasteries and abbeys. The raw wool was sent at first to skilled medieval textile craftsmen of Florence and Venice and, later, to equally skilled woolen cloth weavers of Flanders, from which country, for many centuries, woolen cloth woven from English wool, after undergoing dyeing and finishing processes, entered world trade.

The English raw wool and woolen cloth industry rose to a position of international prominence until, nearly nineteen hundred years later, when almost solely due to inventions of machines for spinning and weaving peculiarly adapted to cotton, the latter fiber finally displaced "our noble and ancient woolen manufacture" as the leading fiber of England. One distinct advantage of England's world trade in wool and woolen products, even from the very start, was that the raw material was raised largely on local farms. There was always national pride in native wool, and this was reflected in opinions generally held in foreign cloth markets, that it was the best in Europe.

It is much to the credit of the medieval rulers of England that they insisted upon establishing a woolen cloth industry on English soil. This step eventually made that country independent of neighboring nations on the Continent which had perfected the craftsmanship of weaving and dyeing wool at a time when England, as a strictly agricultural country, was content merely to suuply raw wool. Even prior to the reign of Edward III, 1327 to 1377, until the close of the brilliant Elizabethan Era, by which time the English textile industry was fairly well established, a succession of English monarchs encouraged weavers and dyers of woolen cloth to leave their homes on the Continent and to permanently settle in England. These alien textile craftsmen were accorded protection and certain privileges by the Crown, for wool, and everything connected with wool, was looked upon as being vital to the economic prosperity of England.

Undoubtedly, the aborigines, who lived in Britain during the Bronze Age of from 3500 to 2500 B.C., wore some form of crude woolen garments. Strabo, the Greek historian who was born in 53 B.C., advances this surmise in one of his historical writings, and, as if to confirm his theory, remnants of wool have been found in burrows of ancient Britons of about that period.

There is no evidence that sheep at any time were introduced into Britain, but there is abundant proof that they have long existed there, nor can it be determined with accuracy at what time raw wool was first fabricated into cloth in England, although it is probable that limited use was made of both hide and hair very early in English history. Strabo tells us that the Phoenicians, who were familiar with both linen and wool, visited the southern coasts of England and Ireland and adds that they may have brought along some of the famous Colchian rams and ewes to be slaughtered for food and wool, in exchange for Cornwall tin and other English raw products.

In a similar manner, the Phoenicians had earlier stimulated sheep husbandry at their warehouse-distribution centers at Carthage, Cadiz and Marseilles. The antiquity of these ventures in trade may be comprehended by Strabo's assertion that, after visiting colonies on the Mediterranean coasts, the small Phoenician sailing crafts passed through the Straits of Gibraltar about 1250 B.C. cruising along the west coast of Gaul and southwest coasts of England and Ireland. Samuel Bochert, a 17th-century French scholar, whose favorite study was the Phoenicians, dates these voyages at about 900 B.C., while modern scholars believe that the first English contact with the Phoenicians took place about 600 B.C. But whatever date is correct, here was proof of ancient trade between England and the Continent.

After Phoenician commerce with Northern and Western Europe had been disrupted because of a series of almost legendary Mediterranean wars, there was little or no foreign trade between England and other European countries for many years. However, a few centuries prior to the Roman invasion, some adventurous Belgae tribesmen found a haven in Britain, and they not only brought sheep and made crude woolen fabrics from the fleece, but they also instructed native Brythens or "painted people," in the art of agriculture, something the busy Phoenician traders had neglected to do.

When the Roman army invaded and occupied Britain in 55 B.C., both wild and semi-domesticated sheep roamed about England, and although the natives used them mainly for food, yet in a primitive way they made limited use of sheepskins and felted wool. From the very meager records of Roman and post-Roman times, a period lasting over five hundred years, we learn that the number of sheep was not large, that they were pastured in rough, hilly country and, being unsupervised, were the prey of wolves to such an extent as to retard a normal increase in the size of the various flocks. Nothing much was done about this condition until the reign of Edgar, the Saxon, 958 to 975.

Wool raising in Britain, on a pseudo-scientific scale, probably dates from the Roman occupation for, because of long lines of army supply, the fixed policy of the Roman high command was to make an occupation force as self-supporting as possible. Therefore, almost as soon as the army became settled, Roman artisans, who were familiar with woolen cloth, instructed native Britons in better ways of caring for and breeding sheep, and also in more advanced spinning and weaving of wool fibers, which the natives seemed glad to undertake for a home market of considerable size was waiting to be supplied. Of these arts, however, the Britons were not exactly ignorant, for the weaving of coarse woolen cloth had been known and, to some extent, practiced for at least a century by these Britons who had come into a series of contacts with outside people such as the Belgae and the Gauls who attempted some trade with England after the Phoenicians had been forced to abandon it.

As the Romans are not likely to have imported raw wool for the purpose of making woolen cloth for the occupying army, it is reasonable to infer that they found native British wool not only sufficiently abundant in quantity, but also of such quality as to warrant its use. Evidently the Britons were quick to absorb advanced methods in sheep husbandry, for we learn that the Roman army soon was able to produce locally all the felted woolen cloth it required. At first, one woolen factory, manned by slaves, supplied this product, but, although local history is silent on the subject, it is not thought that Roman activity in woolen cloth was confined to a factory they established at Winchester or that woolen-cloth production was at any time abandoned while the Romans were in possession of the country.

Undoubtedly, other woolen factories were operated for supplying commercial needs which called not only for felted wool but also a lighter woolen fabric that resembled worsted. According to Alexandrinus, a Roman historian of that period, the products of British wool factories under Roman direction enjoyed a good reputation in Europe, for the Romans, said he, "had succeeded in placing British woolen products on a level with Rome itself." However, the original Roman factory at Winchester seems to have been the best equipped and staffed, for at that factory, in the 3rd century A.D., was fabricated a woolen garment as a present for the Roman Emperor, Diocletian, which was called "British Cloth," and which, according to Dionysius Periegeter, a 4th-century geographer, was described as being "made of the wool of Britain which is often spun so fine, that it is, in a manner comparable to a spider's web."

When, after crossing the English channel from Gaul, Caesar invaded England, he found an ancient Celtic race that is thought to have come to that country soon after the Stone Age. The Romans called them "Picts," or in another form "Brythen," a Celtic word meaning "painted people." In his "Commentarii di Bello Gallico" (Book V), Caesar reported: "All Britons stain themselves with vitrum (a blue color) which grows wild and produces a color which gives them a terrible appearance in battle." We should remember, however, that Caesar was a military leader, whose armies penetrated into the interior of Britain, and that those more primitive people had not experienced contacts with other nations as had their brethren who inhabited the coastal areas of Britain.

Other less prominent historians state that soon after the Romans arrived they found two types of native woolen clothes worn by the natives of towns on the invaded coast. One was reported as a thick, harsh, woven, woolen cloth similar to a Scotch plaid, worn as a mantle, not greatly differing from clothing worn by the Belgae who had previously established small colonies on the British coast. The other was of fine-spun, woolen cloth, woven in a checked design in different colors, which suggested the same Gallic influences that gave birth to Scotch clan plaids. This costume consisted of a loose coat or cloak, open in front, which fell to the knees and had long sleeves which were loose above the elbows and tight below. Boadicea, the brave British Queen who was an intended victim of Nero, usually wore under her cloak "a motley woolen tunic checkered all over with many colors from native shrubs." Under the loose outer garment, men usually wore a trouser-like unit which was called the "briges" by the natives and "braccae" by the Romans. When a garment of this type was not worn, the men substituted a form of woolen hose, cross-bandaged below the knees. These types of costumes seemed to have been common in Britain from the 2nd to the 8th centuries.

From the records made by Anidius (Dion) Cassius, who in 175 A.D. was assassinated by his own soldiers, we learn that, after two centuries of occupation, the Romans broadened their woolen-cloth program by encouraging the manufacture of cloth in the homes of previously trained craftsmen who in turn instructed their women and children. Also, working with both slave factory weavers and rural craftsmen in their own cottages, were highly skilled woolen textile workers who produced a fine quality of woolen cloth for Roman army and civil government officials. The woolen-cloth workers of Britain had been so well-trained in the art of converting wool fibers into cloth that, when after about four hundred years the Roman occupation finally ended, ancient records state that "products of English looms found their way into all of Europe."

Important as British wool and woolen cloth may have become under Roman rule, almost as soon as the armies of Rome departed from England, presumably to assist in the defense of Rome, the growing British woolen industry faced rapid deterioration. Almost immediately there began a period of English history that witnessed a succession of invasions by Angles, Danes and Saxons, which, although not the largest migration of Germanic tribes during ancient and medieval eras, yet was one of the most important. Both Angles and Danes brought with them a knowledge of crude spinning and weaving, but there was no real renaissance of English textile arts until the arrival of William the Conqueror in 1066 A.D.

When, during the 5th and 6th centuries, semi-barbarous Saxon tribes invaded and overran England, little could be accomplished to promote and sustain a woolen industry that had been off to such a fine start under the Romans. Ownership of private property was precarious, and although there was no forced expulsion of Britons, yet hundreds of sheep husbandmen, as well as hundreds of spinners and weavers of wool, added to the chaos by voluntarily crossing the English channel to settle permanently in a section of France which they named Brittany. About four hundred years later many descendents of these British emigrants, who still were active in woolen production, returned to England with William the Conqueror.

The warlike Saxons, who ruled England from 827 to 1066, concerned themselves but little with peaceful agricultural pursuits, but Edgar, a Saxon king who ruled from 958 to 975, is recorded as having "studied the needs of those who were traders in wool." Among the few laws that bore his approval was one of 966 A.D. which "prescribed that a weight of wool was not to be sold to our people for more than half its weight in silver." He also proclaimed measures to destroy predatory wolves "thus manifesting solicitude for preserving English flocks," an action which is quite unusual at such an early period in English economic history. In those far-off days a "sheep and its lamb" sold for one shilling "until a fortnight before Easter," yet under occasional prodding by the more gentle Saxon rulers, breeding of sheep slowly advanced in Britain.

Although the emigration of English wool weavers to Brittany proved to be a temporary set-back to the native woolen industry, yet by the end of the 7th century, wool weaving was once again a thriving activity in homes of all ranks. Weaving of wool was especially recommended by St. Aldheim as "an occupation for maidens." Ladies of rank, even Saxon princesses, acquired so much skill in the art that another contemporary observed that "webs woven, with shuttles flying from side to side, form a variety of images for woolen cloth." Such rich fabrics undoubtedly were destined for a medieval church or its clergy. In 747 A.D. an ancient nonconformist exhorted English maidens to spend more time reading and singing psalms, rather than "weaving and knitting (embroidering) vainglorious garments of many colors."

During the Middle Ages sheep were important segments of so-called "estate economy," and production of woolen cloth continued, not only in the cottage, but also in convent and castle. This expansion of the English woolen industry stimulated sheep raising, not only for domestic need, but also to meet a demand for English wool that had early developed among textile manufacturers of Italy and Flanders. Every small farmer contributed his modest share to supply a foreign market eager for English wool. Although the bulk of raw wool, not consumed in England for weaving into cloth for domestic consumption, was shipped to foreign cloth merchants, yet it is possible that, from very early times, English-finished woolen cloth was also exported to the Continent. Early in the 8th century mention is made of English cloth merchants visiting Marseilles, and also in the same century one of the oldest, if not the first, official trade treaties to be issued by a sovereign of Western Europe was negotiated in 796 A.D. between Emperor Charlemagne of France and Offa, King of Mercia in north-midland England. By this document, Charlemagne granted a charter to "English pilgrims in France to carry on trade in all our dominions." In an accompanying letter he added the statement "our subjects make request concerning the size (length) of woolen cloaks; that you will have them made of the same pattern as used to come to us in old times." The Charlemagne-Offa treaty is evidence of early foreign markets even during the so-called Dark Ages. However, it should be remembered that, although early English history is full of allusions to various forms of textile activities of that nation, giving us reasons to believe that during the first nine hundred years of the Christian era the woolen cloth industry was not entirely neglected in favor of exporting raw wool to the Continent, yet for several hundred years it does not appear in any records, which have survived, that English woolen fabrics were superior, or even equal, to similar products of Continental looms.

With the accession of Alfred the Great, who ruled from 871 to 901, attention was again given to stimulating the profitable wool industry of England. Alfred's mother comes down to us in English history, not only as being skilled in spinning wool, but as also instructing her daughter in that art, and thus is credited with establishing spinning as the work of women in the home. Alfred had an advantage over local kings of his realms, in that, for his times, he had widely traveled and was familiar with neighboring countries that were potential customers not only for raw wool, but also for finished woolen cloth.

The conquest of England by William of Normandy, in 1066, to "rescue it from "semi-slavery" gave, at first, but little impetus to the manufacture of woolen cloth, for these Normans, with their rough woolen tunicas, added little to what the Anglo-Saxons already knew about spinning and weaving wool. Therefore, their coming marked no immediate great change in textile technique. Even a member of William's company admitted that the people whom William hoped to "redeem" showed considerable skill in the textile crafts. Perhaps the great contribution of the Normans was in their acting as a catalyst in successfully unifying the various racial elements in England, and in devising a form of working agreement with the individualistic and predominant Saxons. Between the times of William the Conqueror and Geoffrey Chaucer, they not only welded Danes, Angles, Saxons and Norman French into common industrial efforts, but also evolved a common language, which further unified the once divergent racial groups then residing in England.

So far as can be determined, the Normans brought no sheep with them to England, but they retained the word "mouton" as their word for sheep, and it was used by the English to describe sheep bred for meat, whereas to the early English, the word "sheep" described an animal bred for wool.

Accompanying William on his mission were a group of wool weavers whose ancestors had fled England in the 5th century because of Saxon oppression. Also, at the later invitation of William, who was England's king until 1087, still other weavers from Brittany crossed the Channel and "under the protection of Queen Mathilde, settled at Carlisle, a haven from oppressive (French) taxes," and as soon as they were permitted, both groups established themselves as English citizens.

It is quite possible that a small volume of English woolen fabrics was exported to "the realms of Charlemagne" through Marseilles as early as the 8th century, but authentic history of the English woolen industry does not appear until after the Norman conquest when guilds of French and Flemish weavers were formed in England. This is ample proof that an organized weaving industry was carried on as a distinctive trade as well as a cottage or household occupation. In the wardrobe of William II, surnamed Rufus, who reigned from 1087 until he was killed by an arrow in 1100, was "one pair of worsted stockings valued at three shillings." This entry indicates that as a result of Flemish weaving technique the distinction between woolen and worsted weaving may have been known prior to his reign.

During these and even earlier times, sheep raising had been more successful in Britain than had been the manufacture of woolen cloth, and European cloth merchants had long preferred British raw wool to finished woolen cloth. However, emigrants from Brittany and those who arrived later from other cloth-weaving centers on the Continent finally brought production of fine British woolen cloth to a successful point.

After two or three other migrations of cloth weavers from Brittany to England, King William welcomed a large group of Flemish wool weavers who sought a home in England after they had been "drowned out by a remarkable overflow of the sea," which had permanently inundated a portion of the Flemish coastal area which they had made their home. These skilled textile refugees settled in Lancaster in the west of England, along the Irish channel. In 1100, the first year of the reign of Henry I, youngest son of William the Conqueror and king of England from 1100 to 1135, other groups of textile workers from Flanders were welcomed in England under his patronage, and by establishing a colony at Pembrokeshire "to manufacture woolen cloth in the Continental manner," he further enriched the growing woolen industry of England. There can be no dispute about the value of these trained artisans, and of others soon to follow, to the textile economy of England during the medieval period. In an old chronicle they are described as "a people exceedingly skillful both in making cloth and in merchandise (selling), and always ready with any labor or danger to seek gain by sea or land."

By 1153, in the reign of King Stephan from 1135 to 1154, English woolen production had reached a point where a royal charter was solicited and granted to the Priory of St. Bartholomew to hold an annual cloth fair, the first of its kind in England. It is presumed that this venture was suggested by former Flemish wool workers then residing in England, for open air, seasonal, cloth fairs had been a part of Flemish cloth merchandising since 900 A.D. From this modest start, originated the great, indoor, cloth markets that for many centuries featured woolen-cloth merchandising in England and where at its peak thousands of pieces of woolen cloth changed hands each market day.

These various groups of medieval, woolen-cloth weavers from Brittany and Flanders remained pretty well fixed in their selected villages until about 1120, when Henry I, in the first official edict concerning these refugees, ordered "scattering and relocation to teach weaving in our own realm." The record continues, "the skill of these people is so great that it seems to be a peculiar gift bestowed on them by nature." It was about this time that a garment called the "jack" was devised. In ancient parlance, the jack was a defensive upper garment worn by horsemen. It was usually made from quilted woolen cloth covered on the outside with stout leather. A medieval writer states: "Jackes quilted of wool and covered with leather, over thick plates of yron that are to werde off arrows." The modern jacket is approximately the same shape.

About 1150, during the reign of Stephan, some Hebrew cloth merchants from Flanders came to England and, "in spite of persecution" to which they were subjected, also participated in stimulating the wool trade of England.

There are many allusions to the making of woolen cloth in early English history, but for many years that country could not rival woolen-cloth production on the Continent. The initial impetus, which the budding English industry had received from the immigration of French and Flemish cloth weavers in the 11th century, was augmented by subsequent immigrations of Continentals due to the almost continuous political and religious persecution in various Western European cloth-production centers. These persecutions created a general yearning for a peaceful haven which England graciously and profitably supplied. These refugee artisans were encouraged by the Crown to permanently settle in and become citizens of England, and this proved to be the necessary step in reviving an anemic local industry to which these alien textile workers gratefully contributed their skill, thus leading England to an ultimate position of primacy in European cloth markets. English cloth merchants held this position for many centuries. These valuable new citizens, so cordially greeted by the Crown, played no small part in starting their adopted country on her "prosperity through wool" program which for many centuries was fostered by king, parliament and the English people.

Outside of the abbeys and monasteries, almost the entire production of woolen cloth in those long-ago days was carried on in the farm house or in the village cottage of the worker, where it could be given attention by the members of the family when they were not busy with farm duties or household chores. The "twelve shilling loom" of that period, however, was usually housed in an adjoining small shed. The word "loom," meaning a specific textile tool, entered the English language at about this time. It comes from the Anglo-Saxon word "geloma" which formerly signified any domestic utensil, and we still retain a vestige of this original meaning in the modern word "heirloom." Probably the first written reference to a loom in the English language was made in the 14th century when an obscure poet wrote "a thousand maidens ply their busy looms." In old Saxon times, the term "weaving" was also applied to watchmaking, ivory turning and other crafts which called for intricate work with the hands.

With the exception of added knowledge of dyes and improved cloth-printing processes, there was but little change in methods of cloth manufacture during the Middle Ages. Cottagers, who supplemented scanty earnings by spinning woolen yarn for home markets, soon found it impossible to follow both farming and spinning, for the rough hands of the farm worker could not produce the fine yarn demanded by local cloth manufacturers. As a result of this awkward situation many farm workers, themselves, produced woolen cloth on their own, small, hand-made looms, and from this purely local activity, there gradually developed a class of highly skilled craftsmen who operated on a piece-work basis. Of less importance was another class of semi-skilled textile artisans who purchased raw material in small amounts and sold finished woolen cloth direct to local consumers.

During these simple, almost primitive times, such metal coins as found their way into small towns were formed of such weight that each coin represented the value of some animal, thus reflecting a primitive conception of capital. The ancient "hundred pieces of silver" mentioned in Genesis were "kesitan," or lamb, and "pecunia," the Latin word for money, comes from "pecus" meaning cattle. The modern word "capital" is derived from the word "capitala," meaning cattle when counted by the head. Even when hard money was paid to the seller of wool or woolen cloth in medieval times, the exchange of goods for money involved ceremonious procedure. After much bargaining on a cottage door-step or at a weekly cloth fair, a sales price was agreed upon, and if delivery of finished cloth was delayed, a formal bill of sale was drawn, but the transaction did not become valid until "beveragium," or drink money, was paid by the buyer, and "denarius Dei," or God's money, by the seller. Beveragium had been a rollicking Saxon custom in England prior to the Norman conquest, but denarius Dei was introduced by the more esthetic Normans, and its significance lay in the fact that this money was supposed to be used to purchase consecrated candles and thereby win the blessing of the Church upon the transaction.

At a very early date in the history of English wool, there was a trend to concentrate trade in small, municipal markets, for until the early Middle Ages, local wool was almost exclusively used in woven fabrics. However, the increase in the number of populated towns between the 12th and 14th centuries created unusual economic problems in cloth manufacture, which gradually removed the sale of home-woven cloth from the neighborhood to a place in the local public market and to even more distant points. During the reign of Richard I, it was declared illegal to sell finished woolen cloth beyond the limits of the town in which it had been produced, and with the expansion of English woolen-cloth manufacture in the 14th century, it was decreed in many towns that woolen cloth could be sold only in the principal public-square market of that town. At Bristol, cloth sales were held only on Saturday mornings, and small traders, as well as out-of-town cloth merchants, were zealously excluded. At London, wool drapers endeavored to gain control of the entire export trade in finished woolen cloth, but their efforts proved unsuccessful. The whole matter ended as late as 1487 in the reign of Henry VII with "a valiant attempt by the Corporation of the City of London" forbidding any of its cloth merchants to take part in "any cloth fair under penalty of a heavy fine," but this arbitrary action was subsequently overruled by Parliament.

But such actions could not halt the growing English wool industry. In the days of King John, 1199–1216, from whom angry barons exacted the Magna Charta in 1215, there was widespread eagerness to learn wool spinning and weaving, and some sort of wool dyeing was undoubtedly being done for, in 1197, King John persuaded Parliament "to regulate the dyeing of woolen cloth" which was offered for sale to the public. As the importance of the woolen industry grew, the British government inaugurated many measures to foster it. Following a Continental custom, Henry II, who reigned from 1154 to 1189, chartered a guild of woolen-cloth weavers and, in addition, granted the exclusive privilege of exporting raw wool to the city of London. However, it appears, from isolated records, that development of local fleece did not keep pace with English demands for fine woolen cloth, and therefore, during this same period, wool for weaving into cloth was imported from Spain. This was firmly opposed by English sheep raisers, and as soon as the king died in 1189, Parliament promptly passed an act making it a crime to "mix English wool, with wool from Spain." History tells us that in 1221 Henry III, who reigned from 1216 to 1272, ordered the mayor of London to burn every piece of woolen cloth in which wool of Spanish origin was used, and the king is reported as having expended twenty pounds "for British woolen cloth." With such an illustrious example the English people were urged not to "seek over precious garments, but to purchase native home-spun cloth." However, the arbitrary statute, which ordered the burning of cloth having mixed Spanish and English wool, and which had been passed in an effort to encourage British farmers to improve the quality of their wool, actually destroyed the incentive for English production. The best raw wool of England was now thrown into the hands of foreign wool artisans who, knowing its value, soon were supplying even England herself with cloth made from English wool.

About the year 1240, imports of fine woolen cloth into England began to be encouraged. Although the effect of it upon native fleece, and therefore upon the income of English sheep raisers, must have been more harmful than would have been a continuance of the use of Spanish raw wool, yet the English "spirit of commerce" countered the "expectant evil" by the exportation of raw wool to Flanders, and thus a threatened surplus was reduced. Traffic in wool between England and Flanders, with but slight interruptions, lasted for about one hundred years, but the commercially aggressive English people, who in the past had often demonstrated a desire to establish a home woolen-cloth industry, did not long consent to the exportation of raw wool to foreign cloth manufacturers, only to repurchase the same wool when it retured to England as finished cloth. During the Middle Ages, England passed so many laws forbidding importation of foreign cloth that historians are confused in what years, what laws were in force, and for what length of time. It is a fact, however, that English cloth weavers of that day were very inferior to the weavers of Italy and Flanders, but so widespread was the eagerness to excel in this craft that the historian Fabyan informs us that "even Edward I," who reigned from 1272 to 1307, "sette his sonnes to scale (clean) wool, and his daughters he sette to wool werke."

In 1261 during the reign of Henry III, the Crown encouraged home production of woolen cloth by actually "prohibiting export of any or all English wool." Even as early as 1261, the town of Coventry was famous for its trade in woolen caps and cloth, as well as for the excellent raw wool from the neighboring countryside. In 1385 King Richard II, who reigned from 1377 to 1399, permitted the town of Coventry to tax, for a period of five years, all wool processed locally into cloth, in order to raise funds for needed public improvements. In 1516 during the reign of

Henry VIII, some Flemish workers, who had settled at Coventry, introduced many new methods for spinning wool and weaving it into cloth, and because of this, the local woolen industry greatly prospered. Coventry was long famous for its blue woolen cloth called "Coventry blue." Its name became historic when, in the 17th century, Covenanters all over England refused to retreat from the royalist armies of Charles I, and to show their defiance of the king's might, all opposition soldiers wore non-fugitive Coventry blue uniforms.

It was an important, if not the first, landmark in the history of English wool when the "Great Council of Barons" declared that "the wool of this country should be worked up in England and not sold to foreigners, and everyone should use woolen cloth made within this country instead of having wool worked into cloth in Flanders." This appeal, however, failed to attract wide support, for the English Government expediently declined to bar export of English wool to Flanders, for they knew that that country could be a valuable ally, or a dangerous foe, in the event of an Anglo-Franco war, for throughout the Middle Ages, France was England's traditional enemy.

This "absolute ban" with its "expedient" exception was found intolerable by Italy and France, so they refused to ship dyes to England, with the result that a contemporary historian records that "many Englishmen wore woolen cloth in the natural color of the fleece itself." In 1271, Henry III made an earnest effort to improve textile craftsmanship in England when he declared "all workers of woolen cloths, male and female, as well of Flanders, as of other lands, may safely come to our realm, there to make cloth."

Prior to the 13th century, English official records were not much concerned with either sheep or wool, but at the beginning of that century England was on the way to becoming a great raw-wool-producing nation, and during the early Middle Ages, wool was by far the country's most important export, and almost its entire wool crop was shipped abroad. She provided cloth weavers of Flanders with such a large volume of raw wool that it was looked upon as good national policy for Flanders to "have perpetual peace with England." In 1279, a "petition of protest" addressed to Edward I asserted that "the value of wool exported to Flanders is nearly equal to one-half the total value of English lands."

Flemish cloth merchants not only fabricated English wool into cloth, but they also resold it in a raw state to all who wanted it. Some Florentine cloth merchants looked upon the price asked for English wools by prosperous Flemish merchants as exorbitantly high, and they ultimately took steps to purchase raw wool directly from England. There are one or two legendary accounts of visits to England by Florentine cloth merchants as early as the 12th century, but the first visit on record is dated 1225, and soon thereafter Florentine cloth merchants displaced Flemish customers as the most important buyers of English raw wool. These old records further state that, at first, Florentine merchants were not willing to risk purchased wool to a journey by sea to Florence, preferring to ship it to towns in Flanders. Thus, no direct exportation of English wool by water to Florence is recorded until 1307.

From the reign of Henry II to the reign of Edward III, the raw wool surplus of England gradually increased, but for some reason or other, perhaps due to the local wars in Flanders and Italy or the prohibition of export laws of England, only a limited volume of exports seem to have provided revenue for English wool growers. It is hardly probable, however, that while foreign demand for fine wool diminished, local cloth merchants would be oblivious to the inferior quality of wool normally consumed at home. These two natural pressures caused English wool growers to confine wool production to the type of fleece which attracted the highest prices and met with the readiest sale. Also, as a result of this condition, Southern England, which for centuries had been the area from which the bulk of English wool had been exported, slowly improved the quality of its flocks and consequently that of its wool. The benefits which followed may be estimated from records which show that, at the opening of the 13th century, the export of less than one thousand sixty-eight sacks of raw wool, each weighing three hundred and sixty-four pounds, whereas in 1340 the volume exported to the Continent was over thirty thousand sacks of the same weight. By the 14th century the most profitable agricultural activity in England was raising sheep for wool.

Ever since the 2nd century when the Roman civil administration of Britain promoted the manufacture of woolen cloth, spasmodic efforts had been made to improve English sheep, and after twelve hundred years, England finally produced the best European wool and was shipping it to Flanders, France and Italy to be made into woolen cloth. English wool was so vital to the commercial prosperity of Flanders that, from time to time, she was forced to accede to political demands of England. With the expansion of the English woolen industry on an almost "international" level, its raw wool and woolen fabrics became objects of political maneuver. Although from time to time England freely exported large quantities of wool, yet English kings almost invariably looked upon the wool trade not merely as an important source of Crown revenue but also as a potential weapon of diplomacy. Although custom duties levied on exports of raw wool represented a large segment of royal income, yet Henry III, Edward III and Henry VII all, at various times, prohibited export of English wool in any form. Often their purpose was political coercion to force some ruler to support England in a current war or to extort some other favor.

In 1326, Edward II, who reigned from 1307 to 1327, proclaimed an edict forbidding the wear of foreign-made cloth in Wales, Ireland or England. "It should not be bought in these realms except by the King, Queen, earls, barons, knights, ladies and their children born in wedlock, archbishops, bishops, and other persons and people of the Holy Church, and seculars who can spend forty pounds sterling a year in rents." At the same time, he granted greater liberties to cloth weavers, fullers and dyers. Before Edward II was deposed he had planned a rather extensive settlement of foreign wool workers in England, but it remained for his successor Edward III to carry out this plan.

Although the English woolen industry had made remarkable progress under early English kings, notably Henry I, Henry II and Stephan, yet it was during the reign of Edward III, from 1327 to 1377, "The Father of English Commerce" that the industry was developed to the point of becoming a national asset, and this made Edward's reign a truly great milestone in England's economic history. Not until his time did the English wool industry expand to any appreciable size. In addition, its development came as a great relief to an exhausted Royal Treasury.

After the battle of Cassel in 1328 in which a Flemish military combination had been defeated, an ambassador of King Edward III, in an effort to teach English people how to fabricate better woolen cloth, at the king's direction, proffered the hand of peace to textile craftsmen of Flanders, which, incidentally was the native country of his Queen. He suggested a safe haven in England, for it had previously been reported to the king that, because of continuous political and economic unrest, many Flemish clôth weavers were eager to leave their native land. The king was fully aware of the expert technical skill of the average Flemish woolen-cloth weaver for, until the 13th century, the chief woolen-cloth manufacturer of Europe was Flanders. At that time, England was almost solely an agricultural nation, and her chief export was raw wool or roughly woven woolen cloth. The ships that carried English wool to Flemish looms often returned to England with cloth which was sold at great profit to Flemish cloth merchants who grew rich as time passed.

During the 13th century, it occurred to the king that this profit might well be conserved for native cloth weavers so, wherever it was possible, local cloth merchants hired spinners and weavers to convert raw wool into cloth. The Crown, however, was harassed in its infant monopoly by high prices which former Flemish cloth weavers paid for English wool, and the refusal of English wool growers to reduce this price. Moreover, English citizens did not care to purchase woolen cloth which had not been fabricated by expert Flemish weavers. As years passed, laws, which attempted to force Englishmen to purchase only English woolens, were not successful, and for nearly three hundred years, Englishmen of wealth favored foreign-woven cloth, although the common people purchased native cloth.

In 1337, an English statute offered protection to foreigners then living in England, and to those who might come, in order that a successful woolen-weaving industry might be established on English soil. It was also suggested that these foreigners become English citizens as quickly as possible and thus become eligible for membership in the English cloth guilds corresponding to those of which they had long been members when living in Flanders. The king frankly stated: "Our people, who are ignorant of the weaving art, as knowing no more what to do with their wool than do the sheep that wear it, and as to any artificial drapery, their best cloth being no better than coarseness, for want of skill in this weaving." Thus it is plain that the king seriously hoped to improve weaving of woolen cloth, and persuaded a few Flemish master cloth weavers, their apprentices, assistants and servants, sixty people in all, to migrate to England.

The national woolen-cloth effort was again enriched when, after one of these migrations of Flemish cloth workers to England, a local distinction between woolen and worsted cloth seems to have developed from the experience of these Flemish weavers while in their native land. However, in English practice, a faint recognition of this distinction is believed to have existed in Saxon times. Some of the earliest Flemish immigrants had settled in the neighborhood of Worstead, in the county of Norfolk, and it was here in 1340 that, for the first time, worsted yarn was commercially made in England, thus making it possible to purchase this new commodity in bulk from English dealers. Stockings made from this material were at first used only by the common people.

That the medieval town of Worstead, in Norfolk, gave its name to this particular type of twisted woolen yarn, rather than that the yarn of foreign origin gave its name to a new community which sprang up because of it, is proven by the fact that Worstead is mentioned in the Domesday Book as an established town that had been in existence in the reign of Edward the Confessor, 1042 to 1066. The first mention of worsted yarn in official English records occurred in 1315 during the reign of Edward II and is in the nature of a complaint that a weaver of Norwich made pieces of worsted cloth only twenty-five yards long but sold them as standard length of thirty yards. However, it must have gotten its name from the town of Worstead because of the large volume produced there for commercial use.

The word "worsted" is found for the first time in English literature when Geoffrey Chaucer, in "Canterbury Tales" (line 262), tells of a coat "of double worsted was his semi-cape." As Chaucer composed this line some time in the 14th century, it carries the name and identification of this fabric back almost six hundred years.

It was also during the reign of Edward III that the first English-made worsted cloth was exported after it had been sold in a local market which was called the "worsted seld." The city of Norwich was the cradle of the infant worsted industry and the "prosperity of the town has been greatly advanced by the mystery of weaving which Flemings brought with them." Norwich reached volume worsted cloth production in 1348 when the city was called "large and prosperous," and later the city played an important part in the coming expansion of the English woolen trade. For two centuries cloth weavers of Norwich turned out worsted yarn and cloth. During the last half of the 14th century and first half of the 15th, many more Flemish religious refugees emigrated to England and found immediate employment in the worsted industry at Norwich and other towns, all of which continued to make rapid progress, eventually expanding their manufacturing zones far beyond both Norwich and Worstead.

It is recorded that these early Flemish emigrants "not only consented to ply the trade of weavers in England, but to teach it to others." Soon hundreds of other Flemish cloth weavers also migrated to England, and from 1346 to 1350, they were followed by still others in fairly large numbers. In this way at last the craftsmanship ground-work was laid for a woolen industry in England. As evidence of how these migrations to England affected the woolen-cloth industry of Flanders, it is recorded that, in 1308, the city of Ypres, a famous medieval cloth center of Flanders, had over thirty-five hundred cloth workers in a total population of eight thousand, and in 1386, it listed but twenty small cloth plants, and a population of six thousand. Other Flemish cities were similarly affected.

In the year 1337, which witnessed the first large emigration of Flemish woolen-cloth workers to England, Edward III declared wool a Crown monopoly and announced that he, as king, would purchase all English wool. To promote this profitable objective, he entered into an agreement with a number of English cloth merchants, who contracted to purchase thirty thousand sacks of wool from English monasteries and abbeys in the name of His Majesty and, within six months, to sell the wool on the Continent at an average price of twenty-five dollars per sack. However, only ten thousand sacks of "monastery wool" could be pried loose, for these religious houses preferred to sell directly to French and Flemish cloth merchants, as had long been their custom. The king, thereupon, seized the entire lot, selling it on his own account, and the disappointed merchants received promissory notes for their investments in the deal. Parliament then again passed drastic laws prohibiting the export of English raw wool.

Following the precedent set in 1120 by Henry I, the "alien weavers" brought from Flanders by Edward III "were scattered over the country-side," and within a short time they were busy instructing English cloth workers in the art of making fine woolen cloth, thereby promoting not only local interest in the production branch of the textile industry, but launching England upon a long career as center of the European woolen trade. According to a comparatively unknown contemporary historian named Fuller, "these Flemings diligently followed their craft" even in spite of isolated opposition by narrow-minded local textile workers. This obscure historian adds: "Happy the yeoman's (journeyman) house into which these weavers did enter, bringing industry and wealth. Such who came as strangers within their doors, soon went out bridegrooms." Another chronicler tells us that, as former monarchs had also done, the king shrewdly ordered "these new strangers sprinkled (distributed) everywheres lest in discontent they may embrace a general resolution to return home."

This important step in promoting textile perfection for English-made woolen cloth worked out so well that it appeared to the king that very soon English-woven wool fabrics would consume all the raw wool that the country could produce. In order to anticipate future raw-wool requirements, or perhaps to artificially create them, the king sponsored a law that prohibited exportation of English raw wool, "under penalty of life and limb." Perhaps another serious motive for this drastic action was his desire to prevent the Low Countries, Italy, France and Germany from obtaining this wool, which at that time ranked second only to the famed merino wool of Spain. Embargo of English raw wool would, in the king's judgment, compel purchase of finished woolen cloth in the English cloth markets. This action, alone, is proof of how extensive had been the influence of the alien Flemish cloth makers upon

English sheep husbandry, and of how greatly these new artisan-citizens had contributed to improvement of home-grown fleece. The non-exportation edict also encouraged illegal activity by smugglers who frequented inaccessible bays and coves on the Channel and North Sea coasts of England. Systematic suppression of these predatory bands saw the birth of the English Navy.

Not only did Edward III encourage foreign textile workers to settle in England, but he also took steps to protect the growing home woolen-cloth industry by ordering that importation of foreign-made cloth be discontinued. In this way, the first historic step was taken to convert England from an essentially agricultural country, as it had been traditionally for over four centuries, to its future destiny as a country renowned for manufactured woolen products. This evolution was fairly rapid. Even during the reign of Edward III, exportation of finished woolen cloth reached such a volume that Parliament imposed export duties upon it, as it had formerly done on the now-banned export of raw wool. Even with an export ban working almost at full efficiency, English cloth manufacturers demanded increased quantities of native wool, and as a contemporary writer complained, it was popularly viewed as "a revolution in agriculture which covers England with sheep farmers in place of wheat fields." At last, England had become a successful rival of her former customers for raw wool and gradually developed a woolen-cloth industry that, for many centuries to come, was to make her wealthy. She even exported woolen cloth to Flanders, and ultimately Flemish cloth weavers, who remained in their native land, were forced to replace English wool by temporarily abandoning their trade and returning to raising sheep.

During a large part of the 14th century, English people dressed even better than did the French. In one of his essays, Sir John Fortesque states that "the French weryn no woolyn, but if it be a pore cote under the outermost garment made of grete canvas, and call it a frok. Their hosyn be of like canvas and passin not the knee, wherefore they be gartered and their thyghs bare. But the English weryn fine woolyn cloth in all their apparell."

Edward III, who rightly earned his reputation in English history as "The Royal Wool Merchant," always refused to wear any but English-made woolen clothes, which caused some agitation favoring compulsory wearing of English-made woolen suits and dresses. As household servants customarily wore coarse woolen dresses, an unenthusiastic nobleman is reputed to have remarked that "it is hard to observe a law whereby we shall not know our wives from our chambermaids." About this time a member of Parliament suggested an Act that "none under the degree of baron should mourn in anything but woolen."

The seeds planted by Edward III in the 14th century blossomed into a thriving industry until, in the reign of Queen Elizabeth in the 16th century, woolen production was England's most important activity.

It is interesting to recall the legend of the woolsack, a medieval relic which is still retained in the House of Lords. According to this legend, Edward III was eager to impress that body of law-makers with the fact that English prosperity depended almost entirely upon commerce with other nations, and as wool was then the principal product exported, he ordered that sacks of wool be placed in the House of Lords, "to put our judges in the House of Lords ever in mind of preserving and advancing the trade and manufacture of wool" and also as a tangible reminder to always bear in mind the significance of wool as a potential source of English wealth. Evidently an ancient Lord Chancellor, when presiding over the House of Lords, found this "tangible reminder" a comfortable cushion to ease the hard boards then used for seats, for ever since that day the woolsack has been recognized as the official seat of his successors. It was first mentioned in a decree issued in 1531 by Henry VIII, specifying the order of precedence in which Court officials were to take their seats "on the several wool sacks provided," but in 1621 it was ordered that the Lord Chancellor "was to have his seat on the woolsack," and that famous relic of the 14th century was placed on a chair in the center of the House of Lords opposite to the throne.

Edward IV, who reigned from 1461 to 1483, modified the rather harsh non-exportation-of-raw-wool law. The reputation of fine-spun, English wool was not only maintained, but greatly strengthened during the early Middle Ages. It was always in great demand in the Low Countries, and even along the Mediterranean Coast where it competed favorably with Spanish wool. Therefore the king thought it was wise to provide an outlet for "any surplus of English wool," especially as the type of fleece grown by British sheep was well adapted to the type of woolen cloth then in greatest demand on the Continent. Although under the new regulations no alien buyers such as Flemish and Florentine cloth merchants, long-time buyers of English raw wool, were permitted to directly export or even to purchase a commodity so necessary to their business, yet citizens of England could do so, with the reservation that all wool so exported must be shipped to Calais. This regulation was in force until the reign of Queen Elizabeth when, once again, free exportation of English wool was permitted.

It was also during the reign of Edward IV, who was particularly friendly to the expanding woolen-cloth trade of

England, that the industry was once again enriched by "thrifty woolen weavers" who were brought to England from Flanders. In 1399, this group of alien textile craftsmen was followed by "merchant taylors who make all apparell whether of linen or wool." Once more, the English government was adopting rational measures to promote its woolen industry, but the rapidity of expansion was not anticipated by the government, nor was the unusual demand for raw wool which it produced. With official blessing, scientific sheep raising spread to all parts of the kingdom "including both fertile and almost barren sections." Landlords and farmers turned their fields into sheep pastures and "everywhere was heard the feet of sheep turning land into gold." Sheep were looked upon as "the most profitable cattle man can have." Soon, not only English, but also Irish and Scottish hills were filled with improved breeds of sheep. The growing menace of land being withdrawn from food-crop production generated wide protest among the non-wool-raising public. This phase of the textile industry proved more attractive than had cultivating the soil. It offered scope for individual enterprise, promising fresh openings for restless and ambitious spirits, many of whom were discontented with the ancestral method of living. These people flocked into towns, and the countryside became depopulated to an alarming degree. In a sermon preached before Edward VI, who reigned from 1422 to 1461, Archbishop Hugh Latimer voiced alarm by saying "where have been a great many house holdings and inhabitants, there is now but a shepherd and his dog."

Sir Thomas More in his famous "Utopia," stoutly denounced sheep, saying "they unpeople villages and towns turning the best inhabited places into solitude, tenants are turned out of their possessions and must either beg or rob."

During the reign of King Richard II from 1377 to 1399, the process of assembling vast lands for the purpose of pasturing sheep had the disastrous result of throwing many farm laborers out of work, creating a tension between the landless farmhand and the State-backed, prosperous landowners. This became acute in 1381 when, to raise State revenues, the king imposed "a head tax of one shilling upon all persons over fifteen years of age." For thousands of farm workers, long out of work and barely able to exist, this proved to be the last straw. Under Wat (Walter) Tyler and other leaders of these angry people, stubborn resistance developed, and during the trouble, the cry of the oppressed rustics was:

"When Adam delved and Eve span,
Who was then the gentleman?"

The Rev. John Bell, an obscure priest who was the author of the rhyme, was promptly executed for so expressing his sentiments. Several centuries later, the poet Pope penned the following couplet:

"It stands on record, that in Richard's time
A priest was hanged for very honest rhyme."

The agrarian changes, which turned thousands of workers from the soil, also provided necessary labor which clothiers were able to employ in an expanding woolen industry. The growth of the English textile industry in the 15th and 16th centuries plainly reflected diversion of rural activities into supplying labor for the woolen industry. The practice of creating large sheep acreages increased the price of farm products so, in 1489 in the reign of Henry VII, legislation was enacted to somewhat restrict sheep raising. This proves that, at this early date, the woolen industry of England was important enough to retard a normal flow of farm crops to the public.

For more than one thousand years, until the end of the 18th century, woolen cloth was hand-woven in the weaver's cottage. As a rule, these cottages were placed beside a running stream although, as early as 1298, civic authorities had prohibited the use of water mills "for any spinning and weaving," insisting upon the use of "the might and strength of man with hand and foot." This prohibition was removed in 1417, on the plea that the use of water mills reduced overhead cost of manufacture by weavers who were in competition with Continental cloth merchants who always used water power. In 1437, twenty years later, the prohibition was again restored, and as late as 1485, an owner of a woolen factory, which had installed a water mill, "was attacked with scythes, jakkes, bows and arrows, with intent to murder him." Such opposition delayed the introduction of textile machinery for nearly three hundred years. Inventors refused to design equipment which spinners and weavers would decline to use because it might destroy their traditional part-time work in the home.

But to return to our worker. On a little clearing of land he grew garden truck and oats which partially provided the family with their daily meals. Cottages usually consisted of two stories. The ground floor contained the living rooms of the household, and the upper floor, with its long row of windows, was the place where the weaver worked part-time on his loom. If for any length of time, bad weather prevented work on his acre or so of land, an experienced weaver could make a saleable piece of cloth by working continuously for a few days. When the weaving was completed, he took the cloth to the nearest local market and displayed it for purchase, either by hanging it over the stone wall surrounding the village church or by exhibiting it on the side of a bridge. When the cloth was sold, the weaver purchased sufficient raw wool to fabricate another piece of cloth, bringing it home to be cleaned and carded by one of the women of his household, after which his wife, daughters and other women, whom he often employed for the purpose, would spin the wool into yarn which he wove into cloth. It usually required six spinners to supply a single weaver with sufficient yarn. Individual wool spinners of this era sometimes achieved remarkable results as, for instance, a spinner who, it was reported, "spun a singularly fine woolen yarn, which, although strong, is drawn to such a fineness that a pound weight of raw wool, measures no less than 168,000 yds. in length." This is equal to about ninety-eight miles.

Before the cloth was sold it was sometimes sent to a cloth fuller who felted it together, using wooden hammers, and then sheared the nap. After this it was cleaned and pressed. At a much later date, most of the cloth made in or near small villages was sent to London, where it was sold to foreign buyers because almost continuous wars on the Continent had interrupted normal cloth manufacturing. Early in the 14th century, a wage-earning class appeared in the woolen-cloth industry, as increased demand for rural cloth production had induced many weavers to hire part-time employees to work in their homes. Soon the busy weaver was able to afford a greater volume of raw wool than was formerly used for but a single piece of cloth, and thus eventually what had formerly been a home became a small shop. Almost all of these medieval cloth merchants belonged to one of the craft guilds, and these guilds inspected the workmanship so carefully that, it is said, cloth manufactured in England at that time was of a better quality than it is even today. It is stated that in those days when fashions rarely changed, a suit of homemade woolen clothes would last not only during the lifetime of the owner, but would be handed down to his son. At one period during the Middle Ages, woolen cloth was considered so valuable that it often was listed in wills, and heirs were named to inherit specific clothes.

One of the quirks in the economic system soon appeared when, notwithstanding increased demand for English-made woolen cloth, steady employment in some towns and villages could not be obtained. Many weavers, therefore, traveled around the countryside, weaving previously prepared yarn on looms in the homes of strangers. Other wandering weavers settled in small hamlets that had produced woolen cloth in Roman times. As the years passed, these towns increased in size, and cloth weavers lived in groups on certain streets, equipping their houses with special shutters which opened on the street in such a way as to form counters for displaying cloth.

In the medieval cloth industry, working capital was not a predominant necessity, for almost every cottage cloth weaver, and even hired assistants, had more than an equal chance of reaching independence. At that time, there was no fixed distinction between employer and employee, and consequently there was little antagonism. Occasionally, a few workers pressed a plea for sudden financial independence, as when in 1364 it was reported that "weavers will not work on the cloths of others except at excessive wages." The start of the true capitalistic system in England can be traced from 1339, when Sir Thomas Blanket "set up his looms in their own homes for weavers and other woolen workers," but attempts to underwrite hired workers in bulk were isolated at that early time.

As early as the reign of Edward III, or about 1360, the wages of agriculturists who did most of the cloth weaving had been fixed by Parliament. However, about two hundred years later, under the title of "an order to yield unto the hired person both in time of scarcity and in time of plenty, a convenient proportion of wages," Parliament enacted the famous law authorizing Justices of the Peace "at the annual Easter sessions to rate and appoint wages of any weavers, spinsters, and workmen or work-women whatsoever." This time was selected as being the logical time for a general assembly of the neighborhood, for, under old English law, "the priest of the parish was, at Easter, entitled to collect tithes from the labor of his parishioners." This State-controlled wage procedure was not new in England and seems to have been approved by the people, for in 1597, the act was confirmed. However, it was ordered that "a Justice of the Peace, who is also a clothier, be not allowed as a rater for any artisan that dependeth upon the making of cloth."

While the Crown did the best it could for the ever-growing class of hired workmen in the woolen industry, English cloth merchants waxed rich. So great was the demand for wool that English cloth weavers of that era imported small quantities of fine wool from Portugal, Spain, and even from North Africa. Everywhere in England, a class of rich cloth merchants came into existence, who, it was said, "entertained Kings at their table, and in taxes, ranked with earls and barons." Quite frequently these new riches were, at least in part, devoted to local philanthropies such as hospitals and schools. Especially noteworthy were the benefactions of "Dick" (Sir Richard) Whittington, who became Lord Mayor of London after meeting a legendary cat and subsequently triumphing over poverty. Sir Richard in later life was a successful London cloth mercer, and when he died in 1432, he donated a large part of his wealth for the building of London's famous Guildhall and gave an endowment to its library. Other prosperous English cloth merchants followed precedents set by buyers of wool in Flanders and endowed magnificent parish churches which, as one poet wrote, "still grace the countryside." Another, but much later, generous woolen merchant of England was John Winchcombe; "our Jack of Newbury" the "great clothier of England," who, it is reported, in 1520, "had a hundred looms in his house, and the hundred weavers he employed were equipped at his expense, and were led by him to Flodden Field."

These were but a few of the great company of English cloth merchants who, from the 14th to the 16th centuries, inspired the English Parliament to declare, in 1454, that the making of woolen cloth "within all parts of this realm, is the greatest occupacon and lyving of the poore people of this land," and, in 1561, induced an English writer to record that "the ribs of people throughout the world are kept warm by the fleece of English wool." In the 16th century, an English innkeeper, named Richard Hakluyt, embarked on a journey to Persia for the reason, as expressed to a friend, "that the woolen cloths of England have no merit if good dyeing be not added, therefore it is much to be wished the dyeing of foreign countries be seen, to the end that the art of dyeing woolen cloth may be brought into this realm, in the greater excellence." It is a matter of guild record that, at one time, a single pound of spun wool, dyed with the famous Tyrian purple, sold for the equivalent of one hundred and eighty dollars.

Almost from its start in England, the woolen industry was subjected to State regulation, but we should not attribute its success solely to State measures, although during the Middle Ages it provided a yearly average of 74% of total customs revenue. In the 15th century, the author of "England's Commercial Policy" stated that "no country was able to dispense with English wool," and suggested that "this gives us the means by which we might rule and govern all Christian Kings." This incidentally, came close to being a fact, when a mere threat to withhold English raw wool promptly humbled the proud cloth-manufacturing cities of Flanders.

The cottage form of textile manufacturing was succeeded by the so-called domestic system, under which the raw material was not owned by the worker but by a class of employers called clothiers, who farmed it out to many weavers. According to this system raw wool was supplied to household spinners and weavers of a nearby district, who were also farmers. Fathers and sons worked on the farm but during their spare time operated hand looms, which were then looked upon as farm equipment. Women, children and old people did the spinning and carding, and as it usually required from six to eight persons to prepare sufficient yarn for each loom, "every member of each family from eight years of age to eighty found employment in preparing yarn for the men folks." These weavers really worked as wage-earners paid by the piece, although the work, under guild supervision, was carried on at home. Each worker earned as much as his individual skill and industry could command. In the 14th and 15th centuries, regulation of these wages was one of the functions of the guilds, but in the 16th and 17th centuries, it was, except for isolated instances, assumed by the Crown.

The English government, however, was rather uneasy, as the domestic system seemed to develop into a so-called factory system. It feared that it presented an opportunity for "unruly spirits to collect together in one center, and stir up disorder." In 1555, the Weavers Act of Parliament, explaining that "weavers of this realm have complained that wealthy clothiers do oppress them, to the decay of a great number of artificers which were brought up in the science of weaving," enacted a law forbidding clothiers "who dwelt outside of the older towns" to keep more than one loom. This law affected rural weaving districts, but not urban centers, and was really a law to check the fast approach of the factory system of cloth manufacturing. As such it gained strong social sympathy, although some of the alleged factories were really philanthropic efforts to provide work for "the poor who have no other employment than what results from a most imperfect agriculture," for in some of the former farming districts over 75% of the people were idle. One of these typical "rural relief" cloth factories was at Boynton where "a building was provided large enough to contain on one side, a row of looms of various sorts, and on the other side a large space for women and children to spin." This particular factory is said to have given work to one hundred and fifty local people "who made very sufficient earnings."

Although stubbornly resisted by weavers who for centuries had worked as individuals in their own homes, the factory method of cloth production offered the undoubted advantage of close supervision and hence certain standardizations even beyond guild requirements. It also overcame vexing delay in returning woven cloth and obviated petty theft of raw material which not infrequently occurred. However, the cost of constructing weaving sheds to house workers and looms in a number sufficient to make the venture profitable and to do this in spite of the almost general opposition by local home weavers presented an obstacle. It was solely this factor that retarded the growth of the factory system until the introduction of machinery too expensive and too large for home use.

Although women had long played an important part in the weaving branch of the English woolen industry, yet in the 15th and 16th centuries employment of women was attacked, and in some districts they were not permitted to weave until the 18th century.

The earnings of weavers varied at different times and in different sections of England. In 1588, some weavers earned less than five pence per day, and almost a century later evidence at a court trial revealed that "weavers of cloth can hardly earn five pence per day, and find themselves meat, though they be strong and able to work." To add to their troubles, weavers could not work all the year round, and there was an average of fifteen weeks that they were out of work. They sought relief in the fields at the rate of one shilling cash and two meals per day, but when there was no harvest to gather nor hay to make, they obtained emergency employment on roads or by breaking stones, and other forms of exhausting labor for which few were physically adapted, because of a normally sedentary life.

About 1500, Henry VII, who reigned from 1485 to 1509, authorized migration to England of "a company of the best workers in wool of Flanders," for the ban of 1376 on the exportation of English raw wool was still in force. These new alien weavers were described as "learned and godly men, being of quiet and sober conversation." During the reign of Henry VIII from 1509 to 1547, a writer named William Thomas wrote a book in 1546 entitled "The Pilgrim; A dialogue" in which he stated: "Besides the abundant meat, there groweth in England great quantities of wool, the finest in all the world, whereof kerseys and broadcloths of London are made, and fine cloths called Antwerps, are also English cloths wrongly named by reason of the cloth mart at Antwerp in Flanders, where the cloths are commonly bought and sold." Possibly it may have been due to this criticism that the Crown forbade its citizens as merchants (that is, sending finished cloth goods for sale) to take part in any foreign cloth fair under penalty of five hundred dollars fine. This measure, however, was later repealed by Parliament. The kersey referred to by Thomas was similar to the peculiar fabric made from raw wool by the women of the island of Jersey to clothe their fishermen kin and was sometimes known as "jersey."

Taxation on wool imports and exports had, from the 15th to the 17th centuries, been sure-fire channels of revenue for every State, so most governments made every endeavor to improve native fleece and to foster their particular national textile projects, building up reserve stocks of raw material and taking every precaution that native-grown wool did not leave their land through legal export, so as not to supply foreign looms which produced competitive fabrics. Practically all governments, when free from political or religious troubles, offered concessions, in efforts to lure experienced textile craftsmen to enter their countries. At the same time, they forbade native workers to take their skill abroad.

During the reign of Queen Elizabeth from 1558 to 1603, a new influx of Dutch and Flemish refugee weavers took place between 1567 and 1575, when thousands of textile workers left their native lands because of cruelties directed by the Duke of Alva, who ravished Flanders and the Netherlands with fire and sword. During a portion of the reign of Elizabeth, the Netherlands, in which present-day Belgium was then included, was a part of the Spanish Empire, and the Duke of Alva, as viceroy of his emperor, was under instructions to stamp out the Dutch Reformation movement. One of the acts of the Duke in 1575 was the tragic pillage and burning of Antwerp, at that time a great industrial city. As a consequence, there was a large immigration into England, which country, at that time, was a firm supporter of the Reformation. These refugees found a hospitable haven, being welcomed by the queen not only as refugees from a tyranny she despised but also as a valuable accession to England's expanding woolen-cloth industry. They were treated with great consideration and were exempted from taxes for five years and granted other unusual favors. There is but a single record of protest, and that concerns "a resolve," dated 1568, reciting that "six or eight foreign craftsmen have been wrongly brought to this English town," but nothing seems to have developed from this petition. It is worth noticing that, during those unsettled days in Europe, England was the only country that possessed sufficient political security to permit uninterrupted industrial activity. In return, these alien artisans introduced new techniques in fabrication of woolen cloth and "promptly established manufacture of finer fabrics which were unknown in this country, or which were beyond the skill of English workers." They also "were ever willing and ready to teach our young children and others, their craft."

Among the so-called finer fabrics was a combination of wool and linen for garments. An amazing incident in connection therewith concerns the aging Archbishop Hugh Latimer, that gnarled but energetic old reformer who, in a pamphlet entitled "Cheats Among Cloth Merchants," remarked: "There is a certain cunning come up in mixing wares." He then launched into an analysis of the practice, which would rival a report of a modern better business bureau. About this time, an Elizabethan antiquary named Lambard records that "the sheep of this realm be now—God be thanked therefore—worthy of great estimation both for the exceeding fineness of the fleece, which passeth all others at this day, and for the abundant store of flocks, so increasing everywhere that this whole realm might rightly be called 'Sheppy.' "

The movement of skilled textile refugees to England during the Elizabethan era was the beginning of the second alien vitalization of the English woolen-cloth industry. The first was after the arrival of Flemish weavers in the 14th century. Of both immigrations, it was recorded that they did much to place England on the road to woolen-cloth supremacy, for "they brought a great commodity hither." The statement was also added that "they live wholly by themselves and do beg no man, and do sustain all their old and poor people."

By this time the English woolen-cloth industry was flourishing, for it was realized that manufacture of silk fabrics could never be as successful as it had been in both France and Italy, and cotton was not yet important. Notwithstanding the fact that free exportation of English raw wool was permitted in an effort to prevent its being smuggled out of the country, enough wool remained to permit great progress in making woolen cloth. Queen Elizabeth issued letters of instruction to all English cloth merchants, outlining methods they were to use in efforts to increase sale of woolen cloth in foreign lands, for almost continuous wars and localized persecution had stifled production of woolen cloth on the Continent. England now was ready to supply all demands for woolen cloth, for she was enriched not only by skilled alien textile craftsmen, but also by native workers whom they had trained. Furthermore, many of these alien textile workers had been bankers and merchants in their native land and had long been familiar with European cloth markets.

It had always been English policy to welcome refugees who could aid in her many attempts to capture the European woolen-cloth trade. When epidemics struck Southern France, when industrious Moorish wool weavers were expelled from Spain, and when, in 1685, because of the revocation of the Edict of Nantes, thousands of Protestants were driven from their native land because of renewal of centuries-old quarrels between French Catholics and Protestants, the wool industry of England was greatly aided and finally was able to triumph over age-old foreign competition. After centuries of supremacy, Flanders was finally compelled to bow to the manufacturers of woolen cloth in England.

Long before the close of Elizabeth's reign, fully 80% of English exports consisted of woolen goods. Sir Walter Raleigh estimated that eighty thousand pieces of woolen cloth were annually shipped from England to foreign countries, but he reported that much of this was undyed. In addition, there were one hundred fifty thousand pieces of kerseys and bayes, the coloring of which would cost one hundred thousand pounds. At that time, these were dyed at Amsterdam and then shipped abroad under the name of "Flemish bayes."

Local consumption of raw wool was also studied from every angle. Parliament passed several Acts, among which was one that compelled everyone over the age of seven to wear a woolen cap when out of doors, under penalty of a fine of three shillings four pence for each offense. This was really an effort to counteract the demand for felt hats and to restore knitted caps to favor. As these two types of head-covering used a different kind of wool, the influence upon fleece production would vary as one or the other gained popularity with the English public.

Although Continental woolen-cloth industries, as practiced in Flanders, France and Italy, had in a large measure depended upon English wool which had been England's most important export during the early Middle Ages, yet it was not until the 15th century that homemade English cloth stifled the woolen-cloth trade of many Continental cities. In this connection, one of the interesting sidelights was the resentment of Florentine cloth guilds when, due to the decline of local wool trade, the great Medici family, leading Florentine merchant-bankers and long identified with wool buying on a Continental basis, organized a woolen factory in England. A subtle reason for taking this shrewd step may have been the discovery of America in 1492, and six years later the discovery of an all-water route to India, both of which made Florence and other cloth-making cities of Italy of minor importance as suppliers of cloth and consumers of textile raw materials. This era was also the period during which England was emerging as the world's greatest sea power and had excluded all foreign shipping from its ports.

Originally the clothing worn by men on the lower part of the body was a single garment called "hose," from which the modern word "hosiery" comes. For the sake of convenience, it was afterwards divided at the knee, forming upper stocks, or knee-breeches, and nether stocks, or stockings. Prior to the year 1561 men wore worsted cloth as stockings, but at about that time the art of knitting stockings was introduced. It is not certain when the first knitter of stockings came from the Palatinate, but it is certain that soon after the revocation of the Edict of Nantes, some French stocking knitters fled to England by way of Hesse, Germany, but their new practice did not attract much notice. However, the art of knitting was not unknown in England even prior to 1550 for knitted woolen caps had long been a usual head-covering. Manufacturers of that commodity complained about the introduction of felt hats as something that would create unemployment although felt hats had been worn to some extent since 1482.

We know that knitted worsted stockings were first brought to England from Italy and that, in 1564, William Ryder, an English lad apprenticed to a local woolen merchant, saw them in a shop window. Being too poor to purchase them, he succeeded in borrowing a pair and soon knitted an exact duplicate. This pair of experimental worsted stockings are thought to have been the first ever knitted from worsted yarn in England.

About 1577, knitting worsted stockings by hand was quite popular in England. It was about this time that they found a valuable outlet among the middle classes as an inexpensive replacement for imported silk stockings, although wearers were subjected to the scorn of professional "silk stocking" politicians who, as Shakespeare relates called leaders of popular movements "worsted stocking knaves."

Machine-woven stockings were first made in England in 1599 by William Lee of St. Johns College, Cambridge University. In his history "Chronicles," Sir John Stowe relates that the Earl of Pembroke was "the first English nobleman to wear worsted knit stockings." This is not surprising, for his Lordship lived at Surrey near Worsted, which was the first city to spin worsted in the 14th century. Imitations of Spanish silk stockings were reproduced in wool by English textile workers, and this novelty met with some success.

Until the latter part of the 16th century, women did not wear close-fitting stockings, but Queen Elizabeth fixed that! During her reign the custom of presenting New Year's gifts was often carried to extremes. An authority tells that upon one such occasion the Queen received a pair of black silk stockings from Italy. Until that time her Majesty had worn loose-fitted, woolen-cloth stockings, but the gift of tight-fitting, silk hose so delighted her that she vowed never again to wear cloth hose.

In 1627 during the reign of Charles I who was king from 1625 until he was beheaded in 1649, an English historian named William Camden, who courageously refused a knighthood offered by a monarch he despised, described English woolen cloth as "one of the pillars of the State," and Thomas Coke, Earl of Leicester and a famous agriculturist, called it "the worthiest, and richest commodity of the Kingdom." The English philosopher, Francis Bacon, who, at that time as Lord Chancellor, currently occupied the woolsack, called wool "the greatest wheel of the realm." In 1610, the Venetian ambassador to England declared "it forms the chief wealth of the English people, more profit is made, more people are employed, and more money is imported by this manufacture, than by all other English products joined together."

In 1621, Parliament passed still another act compelling even the more highly placed sons of Britain to wear English-made cloth, but in voting against this measure a member of Parliament remarked, "it is hard to support a law where we shall not know peers from servants." A section of this famous law stated that judges, university professors and their students, and professors of law should wear English woolen cloth.

Even as early as 1622 a Crown Commission reported that "the laws now in force concerning the making and dressing (finishing) of cloth, are so many and intricate, that it is very hard to resolve what the law is." But the English woolen-cloth industry faced trouble when they endeavored not only to get these laws "rationalized" but also asked for the exclusion of all foreign competition. In this they came into collision with English sheep raisers and, in a measure, again drove many from the farm into the cloth factories. In 1624 a member of Parliament remarked: "We have too great a woolen-clothing commonwealth. Clothing is the greatest wealth and best employment of the poor, yet, we may, peradventure, employ ourselves with better plenty and profit, in using more tillage than to trust so wholly to the making of cloth." These preliminary steps finally put cloth manufacture under national control which evolved a uniform system of regulation. It was the first unit of English industry to be so regulated.

During the 16th and 17th centuries wool spinners were poorly paid for their labor, and it was frankly admitted at the time that the greatest industry of England was virtually based on sweated toil. At a trial during the reign of Charles I, it developed that "the poor that spin, though they work very hard, cannot gain four pence a day towards their living," and at the close of the 17th century it was estimated that "a spinner walked thirty-three miles while stepping back and forward to the wheel in order to earn three shillings." Boys of eight or nine years of age earned two pence for twelve hours of labor, and boys six years old earned but a penny per day. Although their efforts were made to supplement family income, yet even these small amounts were often reduced under one pretext or another. Family wool spinners were unorganized and therefore powerless to resist oppressive conditions.

The working day for weavers was even longer, but the pay was better. Adam Smith wrote: "A shepherd has much leisure, a husbandman some, a cloth weaver none at all." A 17th-century writer recorded: "A poor weaver sits at his loom from four in the morning until eight, nine or ten at night, but to get seven, eight or ten shillings a week for his livelihood." Within sixty years a new law corrected this condition by constituting fourteen hours a legal day's work. Even then, a weaver told an investigating committee of Parliament that "in winter we work as much by the candle as by daylight."

"In the olden times there were two kinds of woolen-cloth merchants," says a 17th-century record, "there being those who supplied shops, and those who exported cloth to other countries." Defoe tells us that "these traveling merchants go all over England with droves or pack horses, and to all cloth fairs and market towns over the whole country. They supply not only the common people by retail, which would denominate them pedlars, but they also supply the shops by wholesale, or whole pieces." On the return trip, the pack horses were loaded with raw wool, purchased or exchanged during the journey. When roads became better, these itinerant cloth merchants used wagons and therefore could remain away for a longer time.

During the 16th and 17th centuries individual English cloth merchants, who wished to export their fabrics, were denied a world-wide market for their goods but were forced to join a company to which was assigned "a territorial sphere" within which it enjoyed a monopoly so far as other English cloth manufacturers were concerned. This system of Crown-chartered companies, whose charters often ran for a period of twelve to twenty years, had the advantage that it "kept up the price of our commodities abroad by avoiding a glut, whereas, where trade is free, many sellers will make wares cheap and of less estimation, flooding markets with goods at lowered prices to the benefit only of foreign buyers." This was an adaptation of a medieval economic theory that by supervised trade in which production was limited, prices might be high, but they were stable because the fabrics, offered for sale to the foreign buyer, were as perfect as was humanly possible to make them. This system also enabled the Crown to control foreign trade and enforce royal restrictions of sale against certain countries—a common practice in that era. Yet it actually retarded trade expansion and checked local enterprise, for no member of a "company of merchants" was permitted to export more than four hundred cloth pieces during the first three years of membership. After a three-year period, the cloth quota rose annually by fifty pieces so that, in the fifteenth year of membership, a cloth merchant could export one thousand pieces of cloth annually.

At the revolution of 1649, free trade was finally thrown open to all cloth merchants, and an "Act to encourage woolen manufacturers" permitted all wool weavers to export woolen cloth to any part of the world" except the Levant, African ports and Russia. It was also forbidden "to transport raw wool beyond the seas as a permanent feature of a trade policy . . . To keep our subjects from idleness by restraining of the wool of this realm from exportation." This attitude was initiated by James I in 1624, repeated by Charles I and Cromwell, and also included in a commercial Act of Parliament upon the restoration of Charles II about 1662. It remained in force until 1825. These prohibitory laws were very harmful to sheep raisers, as production of raw fleece far exceeded consumption. This contributed to a collapse of wool prices. As had happened in the 14th century when similar prohibition of export had been imposed, smuggling became an organized activity, and again many colorful sea-coast people waxed wealthy.

During the 17th century, the cloth trade of England suffered considerably from the long struggle between king and Parliament. Yorkshire woolen merchants sided with Cromwell, and since much fighting was done in this country, the Yorkshire cloth trade passed through several years of hard times. The town of Bradford was besieged and hung woolsacks on the steeple of the local church to protect it from royalist cannon balls. Records do not state if the church survived attack, but the town itself was taken and quantities of wool yarn, finished cloth and textile tools were lost.

When the civil war was over, the English cloth trade grew by leaps and bounds. Peace at home and improved communications by sea, with new colonies abroad both in America and Asia, contributed to this growth. Great indoor cloth markets were built, and in these "Cloth Halls" and "Piece Halls," as they were called, there were scores of small rooms and stalls, so that each neighborhood clothier could rent a display room of his own. Thousands of pieces of woolen cloth changed hands every market-day, and cloth counties, like Yorkshire, sold woolen-piece goods as far away as Turkey and Astrakhan.

Oliver Cromwell, Lord-Protector of England from 1654 to 1658, feared the effect of American colonial textile activities upon the English woolen industry and therefore prohibited export of sheep wool and woolen yarn to all colonies of England. Undoubtedly, Cromwell fully appreciated the situation, for at one time he had been a woolen-cloth shearman (cloth finisher), and his son Thomas, who had married the daughter of another shearman, had at one time, been engaged in the business of finishing cloth.

During times of stress for the English woolen industry, many strange laws were enacted in an effort to stimulate home demand for woolen products. For more than one hundred and twenty years, it was illegal to bury a person in "any other shroud or covering than pure English wool." Excerpts from the weird Statute of 1666, passed during the reign of Charles II, are rather quaint: "For the encouragement of the woolen manufacture of the Kingdom noe person shall bee buryed in anny shirt, shrowd, or sheete made of wool mingled with flax, hemp, silk, haire, gold or silver, or other than what shall be made of wooll onely or bee putt intoe anny coffin lined or faced with anything made or mingled with flax, hemp, etc. upon paine of the forfeiture of the summe of five pounds, toe bee imployed for the use of the poor of the parrish where such person shall be buryed." An even more stringent Act was passed in 1678, and these acts remained on the State books until the 19th century. As one 17th-century critic expressed it, "this law forces our dead to consume what the living were inadequate to purchase." Three years later, in 1681, the House of Commons rather inelegantly presented an address to King Charles II "praying that you encourage the weaving of English manufactures by your own example and the Queen's."

In 1688 James II, who reigned from 1685 to 1688, issued a proclamation prohibiting exportation of undyed woolen cloth "even by the Merchants Adventurers" and granted a monopoly (patent) for dyeing to a London cloth merchant. However, Dutch and German cloth merchants, who had long dyed unfinished English woolen cloth, succeeded in having their governments forbid entry of "any dyed English fabric," so eventually the "monopoly was withdrawn as its owner could not dye cloth fit to wear." King James often spoke of wool as "the staple manufacture of my Kingdom" and with this thought his successor, King William III, agreed, pronouncing it to be "the greatest and most profitable commodity of this Kingdom on which the values of land, and the trade of the nation do chiefly depend." During William's reign, from 1689 to 1702, it was estimated that, after the Restoration in 1660, woolen manufacture accounted for "near two-thirds" of general exports, and Englishmen proudly boasted "we clothe half of Europe by our English cloth, making the Continent the servant of England, since it wears English livery." The poet, John Dryden, frequently applauded both sides in many political and religious discussions, yet he seems to have been firmly and permanently convinced about wool, for in 1683 he wrote:

"Though Jason's fleece was famed of old
The British wool is growing gold
No mines of wealth, can more supply
It keeps the peasant from the cold
And takes, for Kings, the Tyrian dye."

In 1700, the feeling against foreign wool was reflected in a law which sought to limit the custom of traveling abroad. It had long been an important part of an English cloth merchant's education to travel to the Continent, and a contemporary writer stated "there are very few important clothiers but what send their sons abroad to familiarize themselves with foreign craftsmanship and to form connections."

Manufacturers of woolen cloth considered the home-market as the sacred precinct for "our earliest, most extensive and most valuable manufacture." They sought exclusion not only of foreign woolen cloth, but also of any kind of textiles which in any way competed with wool. When the East India Company offered imported cloth, probably both silk and muslin, from the Orient as substitute for woolen and worsted cloth, great alarm was felt "lest they become the general wear." Wool weavers, supported by a majority of English wage-earners, openly attacked people "who wore cloth from India." One writer of this period stated: "I question not but we shall have foreign cloths and knaves to make it a fashion, and fools to wear it." It was reported at that time that Englishmen could not compete with Indian textile labor "since the people in India are such slaves as to work for less than a penny a day, whereas ours, here, will not work under a shilling." A rather difficult but not unusual problem in trade economics entered this picture, for England had started exporting "great quantities of woolen goods to India in exchange for muslin and silk, and the effect of prohibiting Indian textiles would be to diminish our woolen exports."

However, in 1720, in the reign of George I, Parliament finally got around to prohibiting the purchase and use of "printed, painted calicoes, the wearing of which manifestly tends to the great detriment of the woolen manufactures of this Kingdom." In 1700, the feeling against foreign cloth, especially wool, was reflected in a law providing that "any woman who attempts to urge a man into matrimony by means of scent, false hair, iron stays, bolstered hips, Spanish wool and other wiles, shall draw upon herself the penalty prescribed for witchcraft, and her marriage be made null and void."

As late as 1724 Daniel Defoe, the famous pamphleteer and author of "Robinson Crusoe," wrote. "nothing can answer all the ends of dress but good old English wool cloth, that other countries must have and none but England can supply—be those countries hot and torrid, cold or frigid, 'tis the same thing near the Equator or near the Pole, the English woolen manufacturer clothes them all. Here it covers them warm from the freezing breath of the northern bear and there it shades them and keeps them cool from scorching beams of a perpendicular sun! Let no man wonder that the manufacture of woolen is arrived to such a magnitude, when, in a word, it may be said to clothe the world." This sounds reminiscent of similar claims made in the 14th and 16th centuries, but as Defoe was widely read in those days, it may be assumed that this eulogy was considered by the prosperous, woolen-cloth merchants of England, as priceless publicity, especially in a day before "personal endorsement" or even space advertising had been developed.

In another effort, this time to fight cotton cloth from India, British wool growers issued a pamphlet entitled "The Ancient Trade" in which the statement is made: "this trade is much hindered by our own people who do wear many foreign commodities instead of our own." A little later they issued a second pamphlet entitled "An Essay on Trade" (woolen, of course) which complained: "The commodities are calicoes and muslins, thirty shilling a yard for muslin, and only the shadow of a commodity when procured." For a while, "above half of the (woolen) manufacture was entirely lost, half of its people scattered and ruined, and this by the East Indian Trade." Woolen-cloth manufacturers again engaged the dependable Defoe to "prepare a pamphlet making sport of chintz and calico." He responded in part with: "We see persons of quality dressed in India carpets which, but a few years before, their chambermaids would have thought too ordinary for them; chintzes were advanced from being upon the floor to their backs, from footcloths to petticoat."

Another attempt to help stem the efforts of the East India Company to increase sales of chintz and calico was made by an unknown writer who announced that "woman should not use a tawdry, pie-spotted, low priced thing called calico, made by a parcel of heathens and pagans, that worship the devil and work for a half-penny a day." When all private efforts failed, protests of woolen-cloth manufacturers and sheep farmers forced Parliament, in 1700, to forbid the selling of cotton goods in England and, in 1712, to forbid the wearing of cotton goods, imposing a twenty-five-dollar fine on the wearer and a one-hundred-dollar fine on the vendor.

About 1788, wool growers of England attempted to obtain limited exportation of raw wool. Not only were they unsuccessful, but even more stringent penalties were introduced, so that "the petted and favored trade," as Huskisson called it, while sheltered from the economic storm of foreign competition, was to a large degree stagnant at home. For many decades, no new fabrics or designs were developed. It was estimated that, about this time, over three hundred laws relating to wool were on the statute books.

As late as the 18th century, woolen yarn was still being spun and woven by hand in the homes of weavers, but many improvements in the crude technique of the early factory system, which revolutionized cloth making, were constantly taking place. Until about 1765 textile workers were usually independent craftsmen and cloth production, whether housed in a cottage or a small weaving shed, was carried out with simple hand-equipment. From this cottage industry have sprung the great English woolen mills, and from the hard-working yeomen of long ago came the pioneers of modern and better methods. When a long series of almost exclusively English inventions for speeding textile-manufacturing processes began to appear, they finally changed the economic status of almost every textile worker and formed the basis for sporadic riots, which lasted for over fifty years. This transition is still referred to as the "Industrial Revolution."

When steam was available, as the result of the invention of James Watt, cloth mills were erected in the neighborhood of towns, where labor and transportation were available. It was this first stage of development that aroused violent opposition on the part of the hand spinners and weavers of England. Progressive cloth merchants risked their lives by installing labor-saving machinery. One newspaper inquired: "Who does not consider the employment of machinery one of the greatest evils that ever befell this country, and who would not rejoice at a return to the rude habits of industry under whose sway Englishmen were at once healthy, happy and contented?" Hand-spinning gradually declined, for "cloth manufacturers no longer depended on the poor for yarn formerly spun in their homes." Less than fifty mill workers could now exceed the output of five hundred cottage spinners.

Quite frequently progressive cloth manufacturers would be attacked by bewildered home-workers who often banded together to wreck newly installed spinning and weaving machines, fearing that they had lost their livelihood and that their families would starve. On their part, the cloth manufacturers were not a little annoyed because these cottage spinners and weavers refused to operate the new machinery. However, the power of textile machinery, which came to its highest peak in England, finally drew the obstinate cloth workers into mills planned to produce fabric in large volume, and when everything quieted down, the cloth worker was better off, and a tremendous expansion of the English cloth trade took place. The factory system had come to stay.

Even as late as 1782, some local officials protested against "machines for weaving cotton cloth lately erected in the neighborhood of Manchester which, if suffered to destroy our woolen crafts, will prove the most fatal discovery ever made in England." But the once obstinate cottage-weavers found it useless to fight the new machines and most of them finally flocked into towns and villages where mills had been converted for use with new devices. The more stubborn weavers, who refused to enter the mills, restricted their efforts to raising sheep and field crops.

It is often assumed that the invention of textile power machinery in England immediately created the factory system which quickly extinguished the age-old cottage or domestic system of producing woolen cloth. This was decidedly not true so far as weaving woolen cloth by machinery was concerned. Although it is a fact that many of the new machines could be adapted to woolen-cloth production, they were primarily designed for the newer cotton-cloth-weaving industry, undoubtedly, because the majority of the world's peoples wore cotton and utilized it for many more purposes. Either in a raw or a finished condition, wool is more expensive than cotton and, because there is not such a large market for it, wool does not suggest itself for mass production in standardized weaves and designs such as printed chintz, dyed calico and other cotton fabrics.

Therefore application of these new spinning and weaving machines to woolen and worsted production was not quickly developed, not only because of the conservatism of the ancient craft but also because spinning and weaving wool fibers differ from the same operations with cotton fibers. Therefore mechanical-processing methods came more slowly. Because of the felting characteristics of wool fiber, it must be lightly spun and does not readily lend itself to the strain of fast-moving machines like power looms. It required quite a long time to adapt machinery for use with wool fiber. At that period, weaving by machine was quite as slow as weaving by hand, and this delayed machine production of wool for nearly one hundred years. During this time, largely because of the lack of adaptability of wool to mechanical handling, woolen cloth became almost a luxury, and its market gradually narrowed, until by 1833, the volume of cotton-cloth production actually exceeded that of wool production. Nevertheless, England was still a prosperous, woolen-cloth-manufacturing nation, and the British woolen industry became fully mechanized in 1850. Even then, so difficult was it to break the habit of centuries that weaving woolen cloth on hand looms persisted almost until the 20th century.

# CLOTH GUILDS OF EUROPE

THE WORD "GUILD" means sacrifice, or feast, and the guild system was pagan in origin. The guilds originated in ancient times as associations of traders. Their operations ranged from Egypt, Greece and Rome, and during the Middle Ages, they were expanded into what were known as merchant and craft guilds. There is occasional evidence of some sort of consolidation of textile workers in Egypt, but fairly accurate records of guilds begin in Greece. About 894 B.C. the Solon laws mention an organization of "emporoi," or traders, and about one hundred years later, there appears to have been a "mankleroi," or association of shipowners, at Athens, Greece. Greek guilds seem to have been important in both the social and the economic history of that country.

Since very early times to well within the Middle Ages, the art of dyeing was developed in a secrecy often restricted to an immediate family. It was passed on only to sons or some other close relatives, but if none existed, the isolated, family-dyeing technique presumably was lost. Individual dyers often specialized in specific colors, and seldom did anyone else know the processes of a dyer. In 715 B.C., however, the dyeing of wool in Rome seems to have been established as a craft, for Plutarch records that in that year, Numa Pompilius, second legendary king of Rome and successor of Romulus, encouraged dyers by establishing a "Colegium Tinctorium" to further develop the industry. If this statement is accurate, this group was the first "association" formed in the textile industry.

The early guilds of Rome and Byzantium enrolled members according to their crafts, and although they affected only a small minority of all workers, they included almost every craftsman in various textile activities. A recognized State status for guilds became a Roman law of a later century, for the official attitude was that guilds expressed democratic principles among workers.

European guilds were first clearly mentioned in 779 A.D., in the form of "merchant companies to promote foreign commerce." The charter granted by Charlemagne in 796 A.D. to "English pilgrims in France," which permitted "an association to carry on trade" in English monastery wool, has been called the first English trade agreement. Charlemagne desired that his realm be "self-sufficient, down to every home" and that wool and even dyes be home grown. However, with increased trade and the emergence of many towns, and even cities, from what had formerly been local market-places, his individualistic plan, only applicable to rural living conditions, had to be abandoned, and French cloth workers formed guilds in the Italian manner. Dutch and other French merchant guilds appear as early as the 11th century, and records of Swedish and Danish guilds are part of the economic history of the 11th, 12th and 14th centuries.

The medieval cloth guilds in the woolen industry began to flourish in the 11th century, and because they were imbued with an atmosphere of brotherhood, the Church very soon fostered the movement but confined its official attention to directing, rather than expanding, it. In Europe, these guilds first took the form of an "association of merchants." The merchants grouped themselves into caravans to promote foreign trade, so essential to a prosperous commerce of that era. They were voluntary associations formed for the mutual aid and protection of members, and the merchants swore not only to defend each other but also to make all purchases from a common fund, an arrangement which continued even after the group had returned home. At first these merchant guilds were small groups, but after combining with other cloth guilds in the 12th century, they acquired a monopoly of the entire cloth trade of many cities.

The merchant-cloth guilds of Europe originated in an economic situation in which literally thousands of farmers, who had added to meager earnings by spinning and weaving woolen cloth for local consumption, soon found it impossible to pursue both farming and weaving, because their hands, calloused from farm work, could not produce the fine yarns which cloth manufacturers demanded. As a result, these farmers abandoned their fields, devoting practically all of their time to producing woolen cloth on hand looms which were part of home equipment.

From this purely rural textile activity there developed a class of highly skilled craftsmen who gradually drifted into small, crowded shops or worked on a piece-work basis for larger cloth factories. Into this picture also came a poorer class of skilled woolen weavers who bought raw wool in small amounts and spun and wove it into cloth which was sold in the neighborhood. Price-cutting developed very early, not only on the part of individual weavers and small cloth shops in the same neighborhood, but also between many of the larger cloth manufacturers who operated in a much wider area. It was this so-called "disastrous situation" that led to the formation of merchant guilds, whose chief function was to protect the interests of every member and to secure "honest workmanship." •In this respect, the importance of guilds cannot be overestimated for, although ruthless in crushing independent competition, yet they demanded and secured craftsmanship of a high order, due to severe tests which they introduced for all cloth offered for sale. Later on, the guild also determined the style and quality of the woolen cloth produced in its jurisdiction by weavers, fullers, dyers and other specialized cloth workers. They also fixed fair prices for the same class of woolen cloth and generally kept a strict supervision upon the entire woolen industry of their district.

Merchant guilds of one country soon entered into relations with similar guilds in other countries, and by this interlocking arrangement which lasted for nearly two hundred years, they practically maintained supervision over almost every woolen-cloth-weaving center in Europe. As world-markets widened, these widespread guild allies often created a monopoly of trade in both raw and finished textile products. This condition actually existed in Venice, and at a later date, great trading groups like the Teutonic Hanse, and the English and Dutch companies, both of the latter chartered by their governments, sought and found world markets for finished woolen cloth to the exclusion of any major competition. This condition called for a general tightening up in guild membership, which reached its peak in the various cloth-making cities of Italy, where children of guild members automatically became members of the family craft guild, and intermarriage between members of different craft guilds was relentlessly restricted, for a potential bride was looked upon as belonging to the craft guild of her family even though she, herself, had never qualified for membership. Another rule that was strictly enforced in many Italian cities was that no person could join more than one guild.

In this way, trade secrets were usually kept inviolate and hardly ever reached competing guilds in other Italian cities. However, due to almost constant inter-city wars and various forms of local oppression, trade secrets were often taken to foreign countries as guild members became unwilling refugees. The safeguards built around guild membership contributed to a proficiency attained by guilds in the same industry, to which free-lance craftsmanship in many less organized woolen-cloth centers of Europe could not compare.

One result of the guild system was that, because of feudal conditions of that era, guilds very frequently were powerful factors in many medieval towns, for during the ascendency of the guild system, especially in Italy, France and Flanders, the city was the political unit, and efforts were made by various merchant guilds to increase the wealth and power of their native cities. In those days municipal regulation of commerce was almost universally practiced, and rivalry was keen between towns, cities and even some of the smaller principalities. In some instances there were municipal customs barriers of varying effectiveness, but in any event all trading was carefully supervised to protect local revenue and, incidentally, guild interests.

Craft guilds came into being as the result of changing methods of production and can be defined as groups of artisans having exclusive right to practice a given trade in strict accordance with agreements made between them, as individual craftsmen, and some local authority. During the 14th century, craft guilds, following the precedents of merchant guilds, often achieved local political power, but, as a contemporary historian relates, "the more effective the participation of craft guilds in municipal government, the more unstable that government became." After conditions of near anarchy had been experienced in some European cities, craft guilds were officially reduced to trade associations.

Craft guilds sprang up as rural communities became larger, often expanding into cities, and the cloth industry gradually outgrew its age-old, cottage method of production. The individual home weaver was replaced by local groups of weavers. There was also a growing demand for better woven cloth than it was possible to obtain from a multitude of non-standardized sources such as the small cottage weaver had at his disposal. Another factor was that, under a program of standardization, it was necessary for each weaver to own a variety of different parts for his loom, and as in many instances the cottage weaver had built his own loom, he was unable to use these new parts. As a result, the small cloth weavers were driven out of business, and many hundreds of them entered the employ of larger and more prosperous cloth makers who, for their own protection, formed their workmen into craft guilds.

There appear to have been guilds of wool dyers in Germany as early as 925 A.D., in the reign of Henry I, and at Nuremberg shortly before 1300, but apparently these guilds either lost their importance or were legislated out of existence. It is known that Dutch dyers were summoned to Germany, a practice that would not have been permitted had guilds, at that time, been as strong in Germany as they were in other countries. Actual guilds of wool dyers are not again mentioned until the end of the 16th century, when it appears that three classes of guild dyers were established in Germany. The lowest grade were plain dyers who used simple colors and whose working hours were from 4 A.M. to 7 P.M. This group consisted of the largest number of dyers and included apprentices, each of whom "must be of free and honest birth," pass three years in the shop, four more as a journeyman, and then travel around German cloth shops for at least three years, in order to produce the required "masterpiece" of dyed wool, for which, in many German cities, it was difficult to obtain approval as the number of local masters was limited. The second class were dyers of "high colors." The third, and highest, class were expert dyers who would seldom consent to guild supervision and, by courtesy, were looked upon almost as independent artisans.

In 1669, this German system of guilds was adopted in France by Colbert, the French Comptroller-General under Louis XIV, when "a statute for wool and silk dyers" was proclaimed. It corresponded almost exactly to the German system, and rigid supervision kept it so for nearly one hundred years.

In an old history of Florence, dyers are referred to as early as 1096, which is even earlier than the reference to weavers. At that time the weaving of woolen cloth was a purely domestic activity, whereas dyeing was a profession followed during prescribed hours. Florentine cloth workers, however, were organized into guilds in the 12th century, but they were not recognized by local guild authorities and were looked upon as being undemocratic. They formed themselves into a religious body at the church of San Onofrai where, it is reported, they met surreptitiously for over one hundred years. History records that the well-established woolen-cloth guilds of Florence showed "an unwarranted disregard for local dyers," notwithstanding the fact that the popularity of Florentine cloth in Europe was "in great part due to its beauty." In 1193, only the weaver's guild, or "arte della lana," and the cloth merchants' guild, or "arte della Callimali," represented cloth manufacture in Florence, and they forbade the formation of a guild for dyers.

The Callimali bought up raw wool and also rough woolen homespun produced in English cottages, took them to Florence for finishing and dyeing and then sold them throughout the world. They not only fixed finishing and dyeing costs, but in 1301 announced that woolen cloth not dyed in accordance with their specification "will be burned, and the dyer of it fined." If the dyer could not pay the fine, his right hand was cut off. Such harsh treatment by the autocratic Callimali led, as early as 1264, to the emigration of large numbers of Florentine wool dyers, and this was the basis for a short but prosperous woolen-cloth industry in Genoa and Lucca, both of which cities organized guilds for cloth dyers.

Medieval Florence has been called the ideal guild city and rightly so, for its economic life was almost exclusively regulated by guild rules, although it was never actually governed by guilds. Florentine guilds also played an important part in the textile development of England, for that country was for many centuries an exporter of raw wool. In 1322, the city prior, or "people's captain," bore the title of "defender of the artisans and guilds." The twenty-one guilds of Florence were divided into higher, middle and lower guilds. Among the first group were Florentine cloth makers whose guild was established in 1215. The guild structure of Florence was different and far more harmonious than were cloth guilds in other cities.

The normal structure of European cloth guilds was simple but efficient, and the woolen-cloth weaving and dyeing industry was governed by a comparatively small group of master weavers, each of whom employed three or more workers who were either journeymen or apprentices.

As has already been pointed out, the merchants, as masters, organized themselves into guilds and soon were able to dominate both production and sale of woolen cloth. As administered by them, the regulations of the craft guilds were very strict. For instance, in some European cloth centers, no one but a guild member was permitted to work in the woolen-cloth industry. Working conditions were as carefully regulated as the custom of the times permitted, and remuneration for each type of work was fixed in every locality. Perhaps the most important innovation was the establishment of a system of apprenticeship which was designed to abolish the more or less haphazard technique of home-weaving, and rigid training limited operators to qualified craftsmen.

Medieval cloth guilds provided no incentive for individual initiative and established a craft hierarchy of masters, journeymen and apprentices. The masters were generally small employers, who owned the tools and had sufficient cash or credit to purchase raw wool. Because of these factors, they were able to subordinate the other two groups.

Apprentices were new workers who were in the process of being initiated into "the mysteries of the craft," and for them the guild demanded strict training. They usually started the process at the age of fourteen, serving seven years in England, six years in France and four years in both Italy and Flanders. At completion of his training, each apprentice wove and dyed his "journeyman's piece," and this was critically inspected by his masters who, if the piece was satisfactory, released him from apprenticeship and advanced him to the rank of journeyman. Journeymen were cloth workers who, although having completed the period of apprenticeship training, had not reached the status of master. In countries other than England, a journeyman usually spent a year or two in obligatory travel, visiting cloth-manufacturing plants in his native land and sometimes in foreign countries. From this fact came his title. A journeyman worked by the day and was expected to become acquainted with the textile technique as practiced at distant places. Upon completion of this program, he was free to return home and, if he could do so, execute a "masterpiece," required in all countries but England. This masterpiece, if approved by a jury of critics, entitled the journeyman to become a master. These masterpieces were frequently so elaborate as to be too costly for private purposes, and many found their way into Continental museums.

Another item of expense connected with advancement from journeyman to master was, in addition to a high admittance fee, the cost of a dinner, which, according to custom, the new master gave to guild members in honor of the occasion. These dinners were often elaborate affairs, and following an ancient European custom, enormous quantities of food were consumed. According to a contemporary report, the guests at a master's dinner in Flanders in 1445 consumed six calves, sixteen lambs, eighty chickens, eighty geese, eight hundred eggs (the latter listed as costing five pence per hundred) besides large quantities of "marrow bones, cream and flour, and every delicacy known to the art of cookery." Dinners given by newly elected masters gradually degenerated into excesses and after a while were severely criticized by a growing group of reformers. During the post-medieval period, guild banquets slowly lost their fantastic character.

During medieval times, the type of journeyman eligible to become a master was strictly subject to guild regulations, and among other requirements legitimate birth and some formal education were necessary. It was also a rule that no master could enter trade until he joined his local guild.

Therefore, a large number of skilled textile artisans preferred to remain journeymen during their active, working careers. After the 14th century, advancement from journeyman to the status of master became even more difficult, and membership was largely restricted to sons of present or past masters. This fitted in with a selfish trend to restrict benefits to a very few eligible craftsmen. Many craft guilds attempted to elect none but "hereditary members." This gradually led to a movement called "industrial freedom" which, in part, generated the industrial revolt of the 14th century. Almost concurrently, laws were passed in France, Italy and Flanders, giving substance to industrial reform. By the beginning of the 16th century, the importance of craft guilds was gradually eclipsed by capital ventures in industry, which, obviously, were outside the sphere of medieval guild activity. In 1776, France abolished all but four craft guilds, and even these were destroyed in the French revolution of 1791.

The change from the handicraft system, as operated under the guild system, to the domestic system which, in turn, became obsolete under the factory system, was very slow. A comparison of these three systems shows that under the guild system the master worker owned both raw material and tools, under the domestic system the worker owned tools but not raw material, and under the factory system the worker owned neither tools nor raw material. Thus, under "industrial freedom," or the domestic system, the craftsman ceased to be an independent unit and actually became a wage-earner, and although he still worked in his home, with possibly one or two helpers, yet his products were sold to a cloth merchant rather than to an individual customer. This system lasted until the 18th century.

# ENGLISH CLOTH GUILDS

Guilds in the form of merchant associations existed in England even prior to the Norman conquest, and some of their statutes which have survived show that, like the Greek "emporoi," their chief purpose was mutual assistance in times of material and political distress.

After the conquest the none too sturdy cloth guilds appear, at first, to have suffered from oppression on the ground that they were peculiarly an Anglo-Saxon institution. In the course of time, however, the guild technique of manufacturing and selling raw wool, and later woolen cloth, awoke with renewed vitality, and at an early date, English towns and even rural communities were granted royal rights to establish local guild chapters. When, after the arrival of William the Conqueror, woolen workers from Flanders arrived in England, they were promptly absorbed into local guilds and, by royal charter, had certain privileges conferred upon them, in return for which, although temporary aliens, they paid local taxes. However, these guilds were not numerous, and it took an economic change to attract individual cloth workers to join guilds in any great numbers.

After an era during which each village and monastery settlement was able to produce almost everything needed for existence, came the growth of towns, many of which had originally been market-places for disposal of surplus agricultural products, finished goods like roughly woven cloth and even simple furniture for rural cottages. These new towns developed on lands of local nobles who, as the town grew, claimed certain civic power which, in time, transformed them into feudal lords who demanded tithes as a leasehold and as the price of protection. In those early days, many cloth weavers and dyers in rural districts plied their trade by permission of their noble landlord, and occasionally this permission was given to a single craftsman in return for fees as low as four shillings per year, a situation which constituted an unfair monopoly at a time when many other cottagers wove and dyed woolen cloth.

As early as the 11th century, the English love of freedom revolted against a system of slowly developing local power, and many towns became bastions of rights for the common man. Thus were obtained the civic and economic rights in 1215 under the Magna Charta. Among these rights was that of "joining together," which legalized guilds. About this time a few guilds of cloth merchants came into existence, and the movement rapidly spread throughout England. The merchant cloth guild, not to be confused with the later craft guilds, came into existence in England about 1100 and, for centuries, was a power in English commerce. In the course of the 12th, 13th and 14th centuries, charters constituting or confirming these guilds, referred to as "Gilda Mercatoria," were granted to a number of English towns. At the beginning of the 14th century, England ceased to export large quantities of raw wool, and a native woolen-cloth trade began on a large scale. The growth of merchant cloth guilds corresponded with this development, and their aims, for the most part, were mercantile. They granted, upon payment of a fee, freedom from tolls and duties, and also immunity from foreign jurisdiction. Most of the great merchant cloth guilds of England were established about 1350 and developed into powerful organizations in their own localities. Even as early as 1284, the merchant cloth guild at Berwick ruled that "no citizen, save our brethren, may deal in wool hides, fleeces or cut cloth."

In London, under Edward III, election of a city council was, for a short time, entrusted to local guilds, but later was turned back to the citizens as a whole. A member of one of these merchant cloth guilds was Thomas Blanket who, in 1350, invented what we now call blankets. These guilds were strictly private societies, some of which supported schools and helped to build town halls, in this way coming into close association with local government in some communities. As a general rule, however, medieval English guilds operated in a narrow zone of trade activity and were important mainly because of their place in economic life.

Merchant cloth guilds at first played a less conspicuous role in small towns and country districts than they did in larger cities. Nevertheless, they were quite powerful in the smaller localities because the predominance of agricultural pursuits not only meant that few, if any, craft guilds had been formed, but that merchant guild members were closer to the sources of raw wool, could dictate that woolen cloth must be fabricated and dyed according to specifications and could purchase finished cloth more cheaply than in places where the cloth craft guilds controlled practically all textile workers.

With the emergence of England from a raw-wool-exporting country to a woolen-cloth-manufacturing nation which solicited world-wide markets for its finished products, a new class of citizens came into prominence. This was a merchant middle class. The oldest and most famous of English trading companies was the "Merchant Adventurers." The date of its origin is unrecorded, but, very early in England's industrial experience, it included wealthy and experienced merchants of London and other cities, who dealt in woolen cloth and kersey, a coarse, thick, woolen material which originated on the island of Jersey.

In time the Merchant Adventurers acquired the right to control English wool trade with the Low Countries and became firmly established in Holland. In 1474 the city of Antwerp, then a Dutch possession, placed at their disposal the famous Engelsche Pant, or English Gallery, from which place English cloth merchants did a thriving business until 1578 when the Spanish Governor of conquered Holland confiscated their property. The Merchant Adventurers then moved to Hamburg, a city established by Charlemagne about eight hundred years before, as a shipping port for northern distribution, only to be excluded not only from that city, but also from the entire German Empire. In reprisal, Queen Elizabeth drove all German merchants out of England where they had been established as chartered "Teutonic Traders" for over six hundred years.

In the 10th century, it became an English law that any merchant, who had completed three sea voyages, was, upon his return from the last voyage, made either a noble or a knight. These voyages were quite hazardous, because of the threatening attitude of competing merchants in the countries visited. This, like Italian commercial ventures into dangerous countries, caused English merchants to unite, as this demonstration of strength made it somewhat easier to gain privileges and concessions from foreign princes and petty feudal lords. In taking this step English merchants were merely imitating the Teutonic Guild of London, which since 979 A.D. had operated under a charter guaranteed by King Ethelred II, "in return for a payment of twenty pounds of pepper each year."

Heretofore, English citizenry, always excepting royalty, had consisted of lords and knights at one extreme, with husbandmen and laborers on the other. To these two traditional groups was now added an artisan class which called for a new social and economic arrangement. Even in those far-off days, England was essentially a wool-producing country, and artisans were largely local workers who not only cleaned and spun raw wool but also wove it on looms and dyed the woven cloth, and then sold it locally. The earliest merchant guild on record in England was a group of woolen-cloth weavers in the 12th century established under charter of Henry I. Other guilds soon followed. Guild members were independent craftsmen who did not sell their labor, but only the product of that labor. Thus, a spinner bought raw wool, either at the local monastery or at the town market on the public square, and sold yarns to the weaver, who in turn sold finished woolen cloth to individual buyers in his neighborhood. Cloth dyers purchased both raw wool and finished cloth, either of which they dyed to the specifications of a cloth weaver or a buyer who anticipated a new suit of clothes. This was the economic frame of medieval textile activity. Each member bound himself by oath to observe the laws of his guilds, to inform guild officers of any strangers in town, to observe secrecy in all matters concerning the guild, which usually were discussed at the "morwenspeche," or morning speech, the regular session of the guild at which its business was discussed.

In medieval England where cloth merchant guilds were more numerous than in any other part of Europe, they were at first more like commercial associations, but, as often occurred elsewhere, guild membership included practically all the rich, influential cloth merchants. Therefore, feudal lords living in textile districts found it good policy to bow to the prestige of a local guild and appoint some of the more influential members to minor, but important, administrative functions which, without impairing the lord's revenue, considerably flattered the local guild. Even a rapid decline of royal power in the 13th century did not materially alter the authority of many of the local lords who, for a long time, continued to enjoy many feudal privileges. In England as well as in other countries of Europe, cloth-merchant guilds or companies retained, and even expanded, these civic privileges until well into the Middle Ages. However, in a few textile cities of Western Europe, social and economic revolution broke out in the 14th century, and many guilds of cloth merchants disbanded.

Alongside of merchant guilds, organized primarily for trading purposes, woolen craft guilds sprang up in England from the 12th century on, and by the 13th century, they had organizations in practically every cloth-making city in England.

Compared with merchant cloth guilds and their predecessor companies, craft guilds at first played only a subordinate part in English textile economy. By 1164, weavers and fullers had formed guilds in seven English cities, and the fact that, in the early history of guilds in England, we find no trace of such a group for dyers may be due to the fact that dyers were long classed as weavers' assistants. Even prior to the Norman conquest dyers had settled at London, one of the principal centers of English dye trade. But guilds for dyers are not mentioned until 1188. By the end of the 13th century woolen craft guilds were very active and had been organized in practically every textile district of England, but they were intensely local minded. In 1280, the weaver guild of Leicester often worked at night on local orders for woolen cloth but forbade its members to accept orders from other cities, as "we have sufficient to do for the people of Leicester." This also occurred during an era of industrial progress during the reign of Edward III, for by the 14th century the English woolen-cloth trade was flourishing.

In many ways, craft guilds reflected the economic unrest of the Middle Ages, in that they crystalized an urge to unite, both for protection and for advantage, and their influence paralleled their increasing numbers. Some writers suggest that craft guild organizations sprang from an even earlier feudal group of manual workers, but this does not appear to be based upon fact because, in England, "villains" were not admitted to membership, although they used leisure time to weave and dye woolen cloth. At that time a "villain" was a house or farm retainer who, because of low income, might be selfish, dishonest or "even evil."

Following a common practice of merchant cloth guilds, the woolen craft guilds eventually united with similar guilds in other industries to obtain joint labor action which, in those days of unbridled exploitation, was necessary. This condition is illustrated by the statement that kings often listened with favor to wealthy cloth merchants who wished to replace local workers with skilled foreign cloth weavers who were acquainted with techniques in weaving and dyeing not practiced in England at that time. Another danger faced by local craftsmen was that during the Middle Ages even lesser sovereigns controlled all of the economic, industrial and political activities of their respective countries. Under the new arrangement, if a cloth guild objected to any proposed measure, threatened joint action by guilds in all other industries often persuaded a sovereign to desist.

Cloth guilds of medieval Europe consisted of groups of skilled textile workers such as weavers, fullers and, later, dyers. Membership in these guilds was compulsory upon all who engaged in the woolen industry of England, and normally these guilds prospered for, with each expansion of trade, the number of textile craftsmen increased. Some English guilds, like their Florentine and Venetian counterparts, admitted women who had long engaged in spinning and weaving wool, at first as cottage workers and later as woolen-yarn and -cloth producers under the so-called domestic system. An early guild was organized for women wool packers, whose work was to pack raw wool for transportation. This guild was governed by a woman warden elected from their membership, and included in their regulations was an injunction "not to bawle, nor scold, uon with anither." In some sections of England, in the early days, one-quarter of all woven woolen cloth was the work of women.

Guild membership in England comprised three classes or grades: 1) master, 2) journeyman, or yeoman, 3) apprentice. During the Middle Ages it was not considered right for an unskilled person to work at a trade without a long period of instruction. A novice, usually a lad of about fourteen years of age, was selected for training by a master for a specified number of years and worked from 4 A.M. to 7 P.M. daily. The master contracted to provide bed and board and, not too often, a small gratuity of about five dollars per year. In return for instruction in his chosen craft, the apprentice bound himself to be diligent, obedient, not to "frequent inns and gaming houses" nor "to marry without his master's license." The latter agreement was strictly enforced, and penalty for violation was doubling the apprenticeship term. However, as an old record of the London cloth workers frankly admits, it was no easy matter to govern the habits of young apprentices for "there hath been, and there is, at this time, great disorder and abuse amongst apprentices, and frequenting of taverns, ale houses and plays, and such like places of disorder and evil, and playing in the fields upon Sunday and holy days." It was "therefore laid down that the master shall have and use, a diligent care and heed, to see his apprentices go to church to hear divine service."

This would indicate that, at least in England, the institution of apprenticeship was not merely a system of standardized technical instruction, but also involved considerable social discipline, with the object of forming not only a trained craftsman, but a good citizen as well. In medieval times, citizenship involved heavy responsibility and many guild ordinances required members to participate in certain religious observances, festivities and pageants, but the regulation of economic factors always took precedence over either social or religious activities.

The length of apprenticeship tenure varied considerably, but it was usually admitted that "sufficient cunning" could be acquired in seven years, and thus an apprentice usually reached the grade of journeyman when he was twenty-one years of age. Now, for the first time, he was a wage-earner, and could, if he cared to do so, (and many did) seek employment in a different factory, or even travel from place to place, absorbing practices of his craft as they were followed in different communities, even in cities on the Continent.

If he was diligent in this new relation to his guild and thrifty in his personal habits, he could, within two or three years, accumulate a small capital fund and then claim admittance to the inner circles of the guild, as a master. He could then set up his own workshop equipping it with the tools of his craft which consisted of a loom and some smaller hand-tools. There were many instances of journeymen building their own looms, for at that time the English textile craftsmen possessed mechanical ability equalled by no other nation. When he had taken these preliminary steps and paid the entrance fee, he was accepted as a master and a guild member. He was still an artisan working with his own hands, although he employed labor and hence was a manufacturer.

During the Middle Ages, each English craft guild constituted itself a responsible judge of the work executed by its members, for one of the chief objectives of cloth guilds was to supervise the processes of manufacture and, so far as possible, to control a virtual craft monopoly in both production of, and trade in, woven woolen cloth. Another function of the guild was inspection, by an official called a warden, of all finished products, so as to make honest workmanship certain. In those simple days industry was looked upon as a public service in the interests of the community as a whole. All woolen cloth, which was found defective in either weaving or dyeing, was confiscated, and penalties for repeated offenses were heavy fines, being placed in the pillory on the public square, or expulsion from the guild. This last of course prevented the individual from working in any other craft profession in England and parts of Scotland.

Another craft guild activity was regulation of working hours, wages and prices. Instead of permitting a master to pay wages of his own choice and fix the sale price of his finished woolen cloth, the guilds fixed wages and regulated prices. There were few violations of these edicts, for guildsmen "who set the brethren at defiance" were usually roughly handled.

In the social field, craft guilds adopted the old Greek practices of contributing to the support of sick and disabled fellow-members and of those who were imprisoned for debt. Records show assistance in cases of robbery, fire and shipwreck, as well as burial of the dead and masses for their souls. Poverty-stricken brethren "received an allowance from the common box," and the more prosperous guild members were expected to arrange legacies for guild charities. Many brethren did so.

Geoffrey Chaucer mentions these guilds in the "Canterbury Tales," when he tells of cloth dyers, weavers and haberdashers, who "wear the livery of a great and serious brotherhood." Among the pilgrims in the "Prologue" to this great poem, Chaucer pictures the "wife of Bath" and says of her:

> "of cloth-making she had such a haunt
> she passed them to Ypres and to Ghent."

In 1396 a large part of the cloth made in the home town of the famed Vicar of Wakefield was fabricated by guild members in "Emma Earl's" weaving shed.

Early in the 16th century English craft guilds had abandoned many of their former prerogatives, and in post-Reformation times they gradually lost their original importance. However, they seem to have struggled for independence but appear to have fallen to the control of the more powerful merchant guilds. This is in contrast to the situation in the 14th century when the political rights of the cloth guilds were more or less clearly defined. During the Tudor period, it was the national policy to bring all craft guilds under strict control, and laws were passed requiring that all guild regulations and orders be approved by the Crown. Whether or not this drastic control was justified, it was inexorably applied, and in the 16th and 17th centuries, the ancient craft guild system in England began to break down. Another reason for this condition was the advent of early forms of mechanical cloth-milling equipment, which called for broader labor relations. However, English cloth guilds retained the shell of their old legal monopoly until the 18th century when they all but disappeared for they were not compatible with the newer factory system, and between 1814 and 1835 all English guilds were gradually abolished by law.

## WOOL IN IRELAND AND SCOTLAND

ALTHOUGH THE PROCESSING of wool into cloth fibers had long been established in Ireland, yet the improvement of local fleece was far less advanced than in other European countries. For many centuries, Ireland produced a quality of raw wool best suited to cheaper grades of woolen cloth consumed in rural areas, and also used in making yarn for worsted cloth, long an important Irish export.

Almost from the time of the English occupation of Ireland by Henry II of England in 1156, the raw wool and woolen-cloth industry of Ireland was frowned upon. Spasmodic attempts were made to stifle it, for England always believed that if a wool trade in Ireland were permitted to expand, it eventually might threaten what the English called "our noble and ancient woolen manufacture." Later on, the English Government made a series of preliminary political moves which, however, temporarily operated to defeat their objective. In 1667, in an effort to eliminate competition with English farmers in the home-market, the English government forbade Irish farmers to export cattle to England, whereupon Irish farmers promptly turned their fields into grazing pastures for sheep, and in due time, wool became plentiful and meat became cheap.

This fortunate combination attracted hundreds of English woolen-cloth workers who, upon reaching Ireland, erected a woolen factory at Dublin and prepared to give British cloth merchants some new competition. Soon thereafter groups of refugee woolen-cloth workers from Holland and France arrived in Ireland, and before many years had passed, Ireland was able to successfully compete with England in most of the "non-political" cloth markets of Europe, so much so, in fact, that English cloth merchants strongly protested to government officials that their trade was being undermined. So, before Irish wool production could develop into an even more formidable competition, England inaugurated "a policy of discouraging woolen manufacture in Ireland." As a buffer, however, the English Government determined to help Ireland develop a linen industry which, by the way, had not been successful in England.

Acting on the continued protests of English cloth merchants, the English Government finally passed an act of Parliament prohibiting the export of Irish wool and woolen cloth to any country except England, and also a supplementary series of tariff laws, which started in 1696, with confiscatory duty on Irish wool products even if shipped to England. Under pressure of the English Colonial Office, through the Lord-Deputy of Ireland, a royal appointee, the Irish legislature, itself, cooperated by imposing heavy export duties on Irish raw wool and woolen cloth "which Irish weavers could make more cheaply than could weavers in England." As a consequence this arbitrary action crushed the small sheep farmers of Ireland, who had not only supplied local factories with raw wool but had exported surplus wool to France and Flanders. It also ruined a flourishing Irish woolen-cloth industry, scattering Irish weavers to foreign soil, and thus as the injured Irish remarked "taught our neighbor (England) to steal from us a manufacture we entirely engrossed before."

This persecution of the Irish woolen industry had much the same effect upon the Irish people as if it had been a religious persecution, for many hundreds of families, including "Ireland's most industrious sons," were forced to flee their native land. Some of the southern and western wool-growing counties were almost completely depopulated. This laid the groundwork for lasting religious intolerance and hatred, merely because the economic jealousy of English woolen merchants worked out to gratify sectarian ambitions of the North Ireland linen producers who were Protestants from England, or refugees from Scotland, France and Holland, as opposed to wool-producing, native Catholics of Southern and Western Ireland. By 1711, the manufacture of woolen cloth, and to a large degree, production of raw wool had been abandoned in Ireland, and with evident self-justification, England announced that she had discontinued the manufacture of linen.

Authentic records of a woolen industry in Scotland go back no farther than 1210, when Alexander II of Scotland granted charters to the cities of Aberdeen, Sterling and Perth, where cloth-merchant guilds were organized. Weavers and fullers were expressly excluded from membership in these guilds, and at the same time persons, who were not members, were forbidden to make or dye woolen cloth. This action drove woolen-cloth weavers, dyers and finishers into the employ of cloth merchants who were members of the local guild. Even earlier than this, there is evidence that the Scottish dye trade was regulated by David I who, in 1134, proclaimed strict rules for its conduct. During the 12th century, the dyeing craft of Scotland had sunk so low that local cloth merchants considered the mere fact of being a dyer by trade sufficient ground for discrimination, and dyers, who did not at once seek employment by a cloth merchant, were forbidden to purchase dyes from anyone not a member of that organization. Any infringement of this rule was severely punished.

At one time there was a variety of sheep in the highlands of Scotland that had wool of a peculiar quality, which has been traced to cross-breeding with a local type of goat. Although this wool was not so fine as fleece from carefully bred English sheep, yet, until the 15th century, Scotland was able to export surplus crops to Flanders. Although Scottish sheep breeders apparently made little attempt to improve the quality of local wool, yet by 1688 the woolen-cloth industry of that country appears to have become really important, raising the apprehension of English cloth weavers. Scottish packmen who traveled to England to sell woolen cloth were often required to post bonds that they would "abandon their trade when within English borders." The English government took steps to stifle the sale of woolen cloth made in Scotland, so the Scots retaliated by prohibiting exportation of Scottish raw wool to England, whereupon England countered with a tight boycott on cloth of any kind made in Scotland, an action which forced many Scottish woolen-cloth weavers to settle permanently in Northern Ireland. Nevertheless, after political differences of the two countries were settled in 1707, the woolen-cloth industry of Scotland did not expand beyond a local activity for a central government at London took every possible measure to protect "our noble and ancient woolen manufacture."

It is probable that the art of knitting woolen stockings, as distinct from the former custom of cutting them from woolen cloth, originated in Scotland early in the 16th century. Historians base this belief on the fact that French knitters of woolen stockings named St. Fiacre, the second son of Eugenius, who is said to have reigned as king of Scotland in the 7th century, to be their patron saint, because the first pair of knitted woolen stockings ever seen in France was brought from Scotland.

Tweeds are not tweeds at all but are tweels. The modern name tweed originated from the first Scottish wool-manufacturing center which was established by Henry I, youngest son of William the Conqueror, who reigned from 1100 to 1135. It was located at the mouth of the Tweed river, and weavers of the 17th and 18th centuries called their rough, homespun, wool fabrics "tweels," which is the way most Scotchmen pronounced twills. As the Tweed river formed the border line and the Scotch woolen industry was largely concentrated in the Tweed valley, the name of that river became associated with the woolen goods it produced.

At the beginning of the 16th century, Scots, who did not wear kilts, wore breeches somewhat in the same form as we know them today. A contemporary writer, who also was a professor at Aberdeen University, states "their hosen were shapen also of woolen which never came higher than their knees." Women, however, were not allowed to wear the woolen brecs or breeches of Scotland, as they were permitted to do in Ireland.

# WOOL IN AMERICA

THE HISTORY OF WOOL in America is usually associated with the eastern seaboard, notwithstanding the fact that sheep were brought to America by the Spaniards and were grazing in the American southwest nearly eight decades before they appeared at Jamestown, Virginia, in 1609. Historians of American sheep husbandry have conceded that, in spite of harsh and restrictive English laws, the American woolen industry had its modest beginning along the eastern seaboard.

Previous to the arrival of Europeans on the Western Hemisphere, there had been no woolen production in America. So far as can be ascertained, domestic sheep were unknown to the American Indian, who did not use the fleece of any native animal to any great extent, although hides were common household equipment of almost every Indian village.

It is a paradox that cotton was the incentive which gave birth to the American woolen industry, but this is a fact. About the year 1600, English cloth manufacturers were offered cotton fiber which, as early as 1519, had been sent to Spain from Mexico by Cortez. Spanish traders urged English cloth manufacturers to purchase it in place of cotton they were then buying from the Near East. About that time, England had given refuge to some cloth weavers from the Netherlands, and they had told agents of Sir Walter Raleigh about the Dutch textile custom of mixing cotton with wool for weaving into a coarse, inexpensive cloth, popular among workers and farmers.

The fact that cotton could be raised on the Western Hemisphere, and possibly within bounderies of lands owned by England, combined with the fact that the woolen industry in England at that time was practically a State-sponsored industry induced Sir Walter Raleigh to form the London Company. Under the auspices of this company, the colony at Jamestown, Virginia, was founded. The historian, Bancroft, said that the first attempt to cultivate cotton in the American colonies took place in Virginia, but the cloth which Raleigh announced that England would manufacture failed to materialize.

Along with the first Virginian colonists, the London Company sent several sheep for use as food. These mutton sheep were of a common, unimproved breed, raised in England solely for mutton, and were the only type of sheep permitted to be shipped out of that country. Undoubtedly, the leader of the colonists honestly thought that he was within his rights when he forbade the slaughter of these sheep, for he had determined upon a limited stock-breeding program in order to provide a constant and safe supply of meat, during the long intervals between spasmodic contacts with the mother country by sea. When the English Government learned of this practical plan, it suspiciously viewed this as an attempt to create a future source of raw wool, although sheep bred for mutton were seldom used for wool-growing purposes in England.

Although much of the raw wool used by the early colonists was sent to them by friends in England and was spun into yarn by neighborhood women, who also used a small quantity of local fleece, a wool embargo was, nevertheless, threatened by England. Quite firmly, the mother country finally declined to send any more sheep or wool to the Virginia colony which she looked upon with much displeasure until, about twenty years later, it was discovered that sheep would thrive better in the northern colonies than in Virginia. Barring desultory activity in sheep breeding in the southern colonies, active sheep husbandry moved to New England.

In 1631, England partially relaxed her restrictions and shipped a few commonly bred, mutton sheep to Boston, but most of these animals failed to survive the rigors of a particularly cold winter. In 1633, a few more mutton sheep started on their western journey, but the mortality during the passage was high, for the largest "Elizabethan vessel," then assigned to colonial trade, was usually not over fifteen tons. This sheep mortality, however, did not displease England, for it had been her consistent policy to keep down the number and quality of colonial sheep. When, and if, the sheep arrived, their survival posed a problem, for they proved to be the only domestic animal that did not multiply freely. It was only by constant efforts that these helpless animals were kept from complete extinction, for the colonists could not sufficiently protect them against a succession of severe winters which depleted many colonial flocks. Not until three years had passed did the New England colonists get around to building barns and shacks for the protection of their sheep.

The depredation of their deadly enemy, the wolf, also took high toll, as the helpless, unguarded sheep ranged the adjoining wilderness for pasturage. Colonial records of Massachusetts and Rhode Island tell of small flocks of sheep cut down by wolves. One town reported "wee lost five sheep and twelve kids one night, by the wolfe," and although bounties for dead wolves were offered by a few colonies, yet constant vigilance was necessary to protect the sheep. Occasionally, a few sheep were killed by roving

Indians who, when questioned, claimed to have mistaken them for wild game. This situation was, for many years, overlooked by the colonists but, as flocks grew in size, became serious and was one of the causes of King Philip's War in 1675. Ultimately, to protect their flocks from both Indians and wolves, most of the colonists of New England transferred their sheep to islands in Boston Harbor and off the Rhode Island shore, but for many decades, natural conditions in the new settlements made the raising of sheep an uncertain venture.

Practically all the northern colonies in America purchased sheep whenever it was possible to procure them, for almost as soon as the first colonists landed they made a brave endeavor to be self-sufficient. The first American-made clothes were buckskin which friendly Indians taught the colonists to tan and convert into soft leather. These crude garments, frequently reworked to make them supple, were carefully conserved in order to protect colonists, especially women and children, from the severity of long, hard winters, then so common. The colonists, who settled on the Atlantic coast, came mainly from England and Holland, and in the homeland of each group, cloth making was a very old craft. There were, of course, no cloth-making mills in the early days of the American colonies, for the average colonist possessed but little cash and usually did without the things he and his family could not make. The children had to learn to spin and weave, and in some colonies, local courts ordered both girls and boys to be instructed in these crafts.

While to a large extent many middle-class citizens of England settled in the American colonies to escape political oppression, yet a contributing cause of immigration to the colonies was the fact that many large landowners of England abandoned farming and turned land into grazing areas for sheep. Consequently, many tenant farmers found themselves out of work, and those who were able to do so came to America. This stream of immigration continued for about twenty years, and resulted in occasional contacts with the mother country and infrequent importation of raw wool and woolen cloth. But when, in 1640, the so-called "Long Parliament" discontinued oppressions, these contacts practically ceased. This, once more, forced the colonists to be on their own. The high prices exacted for woolen cloth brought from England acted as a stimulus to colonial weaving, although the colonists knew that any large production of raw wool and woolen cloth would make the woolen industry the first colonial industry to face the displeasure of England, in view of her policy of keeping the colonies dependent upon her for all manufactured goods. As it turned out, this young industry did incur her displeasure.

In 1643, the colonial authority of Massachusetts ordered that "an accounting of all sheep in neighboring towns be made" and urged increase in the many small flocks. It was then estimated that there were over one thousand sheep in the Massachusetts Bay colony alone, and that, with the exception of the few sheep brought from England, they had sprung from the original stock. However, about fourteen years after the landing at Plymouth, trade relations were initiated with the Dutch settlement on Manhattan Island (New York), and from that source this colony obtained forty sheep of the Texel breed, which Dutch colonists had brought from Holland. In 1635, more Texel sheep were purchased from Holland by the Massachusetts colonists, and a considerable quantity of raw wool came from Malaga and Balboa, Spain, to amplify the stock of native wool. About this time, a contemporary writer stated: "With wool and linen yarn, we can now make dimities and fustians for summer clothing, and we hope soon to have woolen cloth made from our own sheep." This hope was not long deferred. In an endeavor to prevent colonial textile skills from passing out with the first generation of settlers, local laws were passed in the various colonies to encourage sheep raising and wool spinning.

The first American factory for fulling woolen cloth was established in Massachusetts in 1643. The Rev. Ezekiel Rogers of Rowley, England, arrived at Boston in 1639 bringing with him a company of twenty families of skilled woolen workers from his home-town and settled them about six miles from Ipswich, a town already well known for its linen lace. They named the new settlement "Rowley," in honor of their ancestral town in England. These Yorkshiremen were "skilled in combing and carding wool," and to them must be accorded the distinction of founding the organized textile industry in America. Working under a local carpenter, John Pearson, they erected on the Mill River "the first mill for sheep's wool in the Western World."

In this fulling mill, was prepared the first mill-finished woolen cloth in the future United States of America. Previous to this time, woolen cloth had been soaked in warm soapsuds in the home and then beaten with sticks on the floor of the living room. According to textile mill design of the 17th and 18th centuries, the fulling room was located on the upper floor of the two-story, stone building, the necessary water power being shared with corn-grinding equipment which, because of its weight, was placed on the first floor. When they finally realized that it was impossible to impress Indians for mill work, the righteous Puritans became the first group in the American colonies to purchase negro slaves, first from the West Indies, and later from Africa. However, the people of New England were the first Americans to abolish slavery within State limits. A few of the more promising slaves were trained as weavers and, in some instances, as designers.

Although the announced purpose of the Rowley mill was to "serve local needs," its broadcloth was so excellent that it continued to weave and finish woolen cloth until the early years of the 19th century. Its organization in 1643 inspired William Penn to establish a similar cloth mill, which long supplied Pennsylvania with woolen clothing. In 1657, woolen-cloth mills were built at Salem and at Roxbury, at Dorchester in 1659, and at Watertown in 1662. The first worsted mill in America was established at Boston in 1695. Spinning of cleaned top-wool owned by the mill was done in neighborhood homes, the spun yarn being returned to the mill on the following market-day. When the owner of this pioneer worsted mill died, his mill equipment was listed as "two pairs of combs, four looms with tacklings and two dye furnaces."

Many colonies offered bounties of tobacco, tax reduction and other incentives for making woolen cloth in lengths varying from thirty-four to fifty-five yards, and this helped to stimulate many local weaving ventures. During the colonial period, in nearly every household the spinning wheel was an important domestic adjunct, as conditions under which the colonists originally lived made it necessary for them to manufacture much of the clothing used in the home. A few colonists had brought small hand looms from their European homes, and we may be sure that, like Grecian women of old, their colonial sisters were diligent in household spinning and weaving. The fixed or permanent hand looms of the colonial period were large, heavy and somewhat complicated. They were constructed of wooden beams and slats by a local carpenter, and, as these heavy looms were normally operated by the men of the household, the woven woolen cloth they turned out was apt to be a rather uneven fabric, although it was improved when fulling and cloth-finishing mills appeared.

Although the English Colonial Office made it a penal offense to bring, or send, any sheep or raw wool to the American colonies and permitted this act to remain in force for over one hundred years, yet so well did the Massachusetts colonists follow the plans of their General Court that, by 1664, their flocks numbered almost 100,000 sheep. In addition, they were purchasing a better grade of raw wool from both Holland and Spain. In 1665 and again in 1690, planters living on Narragansett Bay paid a large part of their taxes by turning over cleaned wool to the colonial treasury, and the wool sheared from sheep raised on Nantucket Island was considered fine enough for export to France. An old document of the late 17th century relates that "this colony was now wearing its own woolen cloth which makes it unnecessary to purchase woolen cloth from England, which England thinks we should do."

By 1675, the northern colonies were producing enough surplus raw wool to send to France in exchange for silk and brocades, and to Spain and Portugal where it was exchanged for wines and spices. This so angered the English Government, which through its Colonial Office had for over twenty years protested this activity, that it finally forbade "our American subjects" to trade with any but the mother country. It also forbade the colonists to transport flax and wool from one colony to another, from loading either flax or wool, or finished cloth on any ship, or to attempt any improvement of either flax or wool fiber, under penalty of having the right hand cut off. England's anger reflects the fact that, up to the outbreak of the Revolutionary War, the American colonists normally absorbed, each year, about one-fifth of the woolen cloth exported from England. The act also, unconsciously recognized the ability and industry of "our American subjects," for at that time the wool and woolen-cloth trade of the colonies amounted to over one-half of their export shipments, and although such laws may have temporarily retarded a promising colonial industry, they could not permanently stifle it.

Notwithstanding the fact that the Pilgrims of Cape Cod and the Dissenters of Narragansett Bay favored the russet brown and Lincoln green dress of the English middle classes who were used to obeying "orders from above," yet they were made of stern and independent stuff and had braved the rigors of a bleak climate and a primitive form of life to practice their conception of freedom of thought and action. To gain this, they quite willingly "lived off the soil" for many decades, using untried ways to meet unexpected needs. At first, there was no currency in any of the colonies, for England did not permit even the smallest unit of money to go to the American colonies. The results of their battle for bare existence had, within fifty years, expanded into a marketable surplus of goods which found favor in the West Indies and some parts of Europe, and mere laws could no longer be a barrier to progress.

Within thirty years after the settlement of the northern colonies, sheep raising and woolen-cloth manufacturing had become an issue between them and the mother country. For centuries, England had enjoyed a virtual monopoly in furnishing raw wool and woolen cloth to Europe, and looked with resentment upon upstart, ambitious colonial competition. However, the English civil wars brought about a short but welcome development of sheep husbandry in the American colonies. The English Government even helped it along, with the selfish view of supplying wool to the West Indies which, during the emergency, were entirely neglected by the mother country. But, in 1654, Oliver Cromwell, Lord Protector of England from 1653 to 1658, feared the effect of accelerated colonial woolen-cloth activity upon the industry of England and, following the practice of his predecessors in power, prohibited the export of English sheep, raw wool and woolen yarns to the American colonies. He, of all English rulers, appreciated the importance of this edict, for in his early life, he had been employed as a fuller of woolen cloth.

The "Non-Exportation Act of 1654," however, had repercussions in the colonies, especially in Massachusetts where, in 1656, the General Court ordered that "Boston Commons be cleared for a sheep pasture" and requested those "having friends in England, desiring to come, would write them to bring as many sheep as convenient with them, if any way presented for avoiding the British embargo." The colonists also arranged credits for purchases of sheep in Spain and Holland, and embarked even more energetically on a program of cross-breeding the types of sheep already in their possession. In order to conserve wool for home consumption, all but one colony prohibited its exportation. This action struck directly at the purpose of England, which was to compel her colonies to supply raw wool to, and then purchase finished cloth from, English cloth merchants.

Also in 1656, a party of "skilled English weavers," defying the age-old English law which "forbade citizens who had a knowledge of the implements used in making cloth" from leaving England, managed to reach New England, and accepted a gift of thirty acres of land near what is now the city of Lowell. Here they practiced their craft in the neighborhood. This gift of land was common in many colonies, and between 1640 and 1700, many records show that wool craftsmen, such as weavers, fullers and combers, were offered free land for a homestead, similar to the small holdings that had been ancestral properties in England. In return for a small fee, the craftsman gave professional services to the community, and in many rural sections of colonial America, the weaver of wool was an important person. He instructed women, girls and even men, in the craft, often offering a prize to the maiden who wove the largest amount of woolen cloth in a given time, the usual prize being a piece of elegantly woven woolen cloth of sufficient yardage for a new dress.

By this and other means the colonists improved the quality of their home-spun cloth, and the New England woolen-cloth industry increased rapidly. The fabric, linsey-woolsey, which was developed about this time, was a distinctive colonial combination of coarse linen warps and wool fillings. It was very popular as outer clothing for winter wear, more popular and far more durable than homespun woolen, and although it did not equal the latter cloth in beauty, it was warm and serviceable. Linsey-woolsey was usually made three-quarters of a yard wide and normally sold for double the price of homespun woolen. It was in greatest demand during the Revolutionary War. Its use gradually decreased but did not entirely disappear until after the Civil War. Even before linsey-woolsey cloth became known, colonists planted patches of flax, as insurance against inability to get wool. Kerseys and flannels were the only other woolen cloths produced during this period, and these were produced only in small quantities. In the field of worsted cloths, a great diversity of fabrics existed during the colonial period, due to the greater weaving skill that this cloth demanded. In this group were serges and druggets, often called "stuffs," which usually imitated foreign cloths.

All this colonial activity was interpreted in England as a permanent trend towards independent commerce, therefore, Parliament once more passed laws proclaiming that "no wool, wool fabrics, worsteds or woolen maufactures, made or mixed with wool, or wool-flax (linsey-woolsey), made in any of the colonies in America, shall be laden on any ship or vessel, nor laid upon any horse or carriage, to be transported to any place whatsoever." It also provided that no English sailors, nor any passengers upon an English vessel, should purchase in any American port more than forty shillings worth of linen goods. This act also nullified a local Virginia law which prohibited any export of raw wool from that colony, and which offered bounties to citizens for making woolen cloth. In an effort to prevent colonial-made cloth from entering England, an unidentified colonial governor was advised by the English Colonial Office to "discourage all woolen cloth manufacturing in your Province, for it will occasion complaints in London. You say, sir, that the people have woven several large pieces of woolen cloth of a useful sort, whereof they sold divers. They may expect no encouragement for setting up manufactures which may interfere with those of England." This short-sighted economic policy initiated a series of oppressive political measures that not only stimulated the colonies into rebellion against the mother country, but accelerated the production of homespun garments.

An even more drastic "Woolen Act" passed by Parliament in 1698 forbade shipment of colonial wool to England, although at that time, England was combing Europe and the Orient for raw wool to meet the demands of her woolen-cloth manufacturers. Once again, it was forbidden to ship thoroughbred rams to the American colonies, as it was thought that this would defeat the admitted desire of the colonists to improve local breeds of sheep, which at no colonial period equalled English breeds. As had previously occurred, the smuggling of pedigreed rams out of England became a profitable sideline for many daring sea captains. All these restrictive measures were intended to stem any possibility of the "setting up of woolen manufacture in the English Plantations in America," and so keep the colonies dependent on the textile products of the mother country.

However, one of the results of these drastic laws was the reaction of English woolen craftsmen who, learning of a growing American textile industry which undoubtedly offered much profit and more freedom to the individual worker, desired to leave England for the colonies. Typical of this attitude was the emigration in 1697 of a group of Quakers from Yorkshire, who settled in New Jersey and, almost immediately, made several new varieties of woolen cloth, presumably from local wool. As if to amplify these efforts, some Swedish colonists settled in neighboring Delaware and "raised sheep, from whose wool they spun and wove" and also "sent some of the wool to Sweden, in payment for their ship passage."

With the introduction into England of the art of knitting woolen stockings by use of machinery, the English Government took immediate steps to organize a monopoly in the sale of these stockings, but before very long, some weavers from Flanders succeeded in smuggling a few of the closely guarded knitting machines into their country. It was from these Flemish stocking weavers that Mennonites of the Rhenish Palatinate, who emigrated to Pennsylvania in 1683, learned how to knit machine-made stockings and how to duplicate the complicated machinery from available raw materials and the usual tools. Upon arrival on donated land which they named Germantown, they erected and equipped the first woolen stocking frame in America. In this way, the first step was taken to shatter the English knitted stocking monopoly which had lasted for about one hundred years. What a blow this was to England may be realized from the statement that in 1695, or twelve years after the Mennonites arrived in America, there were nearly fifteen hundred woolen stocking knitting machines in or near the city of London, and ten years later, there were one hundred such machines in Germantown, alone. The earliest mention of knitted woolen stockings in America was in 1689, when it was related that Dutch traders, in bartering with Indians on a site near the present city of Albany, New York, exchanged six pairs of these stockings for one beaver skin, and at an Indian camp near the present city of Montreal, French traders demanded, and received, two beaver skins in return for six pairs of woven woolen stockings.

Worsted cloth did not become important in colonial commerce nor was it sold in cloth shops until about 1788, when the first worsted mill, in which water power was used, was organized at Hartford, Connecticut. This is said to have been the first American textile mill operated on a strictly business basis. It was financed by subscriptions to stock solicited in nearby towns, and over six thousand dollars were raised. It was not until the middle of the 18th century that the great textile machines appeared, and power, other than that of the hand or the result of animal strength, gradually blotted out the cottage handicraft era of colonial experiences.

Everywhere in the colonies, except in New England where wool was made into clothing, the sheep industry had long been neglected. In 1765, sheep were raised in New York mainly for live export to the West Indies in exchange for rum and other semi-tropical products, but in New England, pre-revolutionary woolen activity was at its height. The larger islands off the coasts of Massachusetts and Rhode Island, such as Martha's Vineyard, Nantucket and Block Island, came to be used for the sheltering of sheep, because of their almost complete seclusion and freedom from colonial government inspection. In 1770, there were about twenty thousand sheep on Martha's Vineyard and fifteen thousand on Nantucket.

When, in 1765, the hated Stamp Act was enacted, public opinion in the colonies was aroused to the necessity for stimulating sheep raising and wool growing. Native sheep, carelessly bred, were descendants of English mutton sheep, Dutch Texel sheep and a few well-bred, European, pedigreed sheep that had been brought in, often by smuggling. They had been allowed to degenerate into common sheep, much to the chagrin of experienced English textile workers who had immigrated to the colonies. Now, however, the colonists became aware of the importance of sheep breeding, and public petitions were circulated in most of the provinces, asking the colonists "to improve the breed of sheep, and thus provide proper wool for our people." Now there was firm determination on the part of the colonists to raise their own fine-quality wool and to spin and weave it into cloth. The detested Stamp Act was opposed by a "non-importation agreement, or pact," which stimulated local cloth production. All efforts to enforce the Stamp

Act resulted in the concentration of public opinion on expanded colonial activity. There was a very definite refusal to purchase any woolen cloth made in England, and it was considered non-cooperative on the part of any colonist to wear imported broadcloth. The "most fashionable person appeared clad in either homespun or linsey-woolsey."

In the southern colonies wool and woolen cloth, never important items of commerce here, increased in volume, and many southern planters, having broad acres and abundant slave labor, set up small workshops for making woolen clothing to supply their less prosperous neighbors. A Virginian, who about 1760 wrote a history of that colony, stated: "We are now dependent upon no one. We not only have provisions, but clothes of our own manufacture, which are made of wool with flax (linsey-woolsey), being our own growth, and our women, of every station are to be commended for industry in spinning and ordering their housewifery to so great an advantage as they do." This is an indication that colonial homespun was finally of such excellent quality that even the proud Virginians did not feel the loss of English fabrics.

In most of the New England farmsteads and village homes, spinning wheels and small weaving looms could be found, and by 1763 spinning was an occupation of almost every household, rich or poor. Spinning festivities on village commons were like holiday pastimes. At Boston, the trade center of New England, free classes in wool spinning and weaving were held in the State House in the winter, and in the summer, these classes were transferred to a corner of Boston Common.

In his famous "Diary," Judge Samuel Sewall tells of a colonial spinning bee on Boston Common, at which "five-hundred fashionable women took part, for the spinning of wool into yarn, has now become in Boston, as centuries before it had been in Greece, an occupation for every householder." A homespun woolen suit worn by a Connecticut cloth merchant consisted of "white homespun wool lined with linen, presenting a picturesque and not unfashionable display of native goods." The Harvard graduating class of 1768 "appeared to a man in black cloth made from Rhode Island wool." In 1767, several influential Massachusetts colonists "sent home for weavers, spinners and equipment, so that in three years time we will not have a farthing's worth of any cloth from England," and public notices were posted asking the colonists to refrain from buying clothes which were made in England.

A "superfine homespun," offered for sale at Philadelphia in 1765, was classed as "superior to any made in England," and only seven years later, "broadcloth made in America" was exhibited in Philadelphia. Previous to 1760, broadcloth manufacturing had been unknown to American cloth makers. Any Philadelphia cloth merchant guilty of importing the hated English woolens was publicly threatened with "loss of custom and most abject contempt."

In New York a small house was erected on "the commons" (City Hall Park) and equipped with spinning wheels and raw wool "for the employment of the poor." So many premiums were offered for woolen cloth that "many people were drawn into competition," but in 1767, Governor Moore of the colony of New York reported to the English Colonial Office: "the custom of making coarse woolen cloth in private families, prevails throughout the Province, and in almost every home, a sufficient quantity is made for the use of the family, without the least design of sending it to market." The Governor might have added: "Without the least design of buying woolen cloth from England."

England viewed these concerted acts with alarm, for her trade in woolen cloth with an expanded colonial population threatened enormous loss. At first she forbade "exportation of any mechanical device for producing cloth, under penalty of seizure of the plant violating this law" but when she finally repealed the hated "Stamp Act," trading was temporarily resumed.

During the Revolutionary War, not only were the American colonies unable to purchase any goods from Europe, but the long-sustained attitude of England in the matter of raw wool and woolen cloth handicapped the revolting colonists in free exchange of these commodities among themselves and placed upon each province the urgent necessity of producing various forms of woolen cloth as quickly as possible. This, in a measure, they were able to do, thanks to pre-war training during the Stamp Act disturbances. From New Hampshire to Georgia, hundreds of village groups were organized to plan increased production of woolen cloth in the homes of the colonists.

In many villages and rural districts, while ministers preached at mid-week prayer meetings, congregations witnessed the unusual sight of men, women, and even children, busy at spinning, weaving, and even carding wool during the religious services. After these services there would be more working in wool, interspersed with singing. The fact that old English folk-songs have survived in many isolated parts of the Eastern United States can be attributed to these rural gatherings, in which spinning and weaving took place. Often when work in the fields or forests was over for the day, young men would join local maidens in a nearby home, and all would sing familiar Old World songs and end the gathering with an Elizabethan square dance. Every daughter was instructed in better spinning, while men and boys, who had been unable to enlist in the army, were expected to become proficient in weaving.

In this way the colonies succeeded not only in satisfactorily clothing themselves but also in supplying warm homespun and linsey-woolsey uniforms and blankets to the soldiers in the field, and they overcame a shortage which, at the start of the war, had caused the soldiers much suffering. As a matter of historical interest, hundreds of yards of homespun woolen cloth were made annually during the war at Mount Vernon, under the watchful eye of Martha Washington, who spent many busy hours in the woolen-cloth workshop of the plantation, which had formerly been used to supply neighbors with woolen cloth. However, of all the thousands of uniforms worn by private soldiers who served in the Revolutionary War, so far as can be ascertained, not a single sample remains.

When, after eight years, the Revolutionary War ended, England and other European countries eagerly sought to develop trade with the new nation which, although it had little money, had many products, such as cotton, timber, tobacco and other assets, to attract trade. Cost prices offered American business men were often one-quarter less than the same goods brought in London, Antwerp or Paris, but the seed of self-sufficiency had become firmly rooted in the American mind. Many young citizens of the new nation retained their interest in patriotic activities, and in 1789, upon learning that the American Constitution had been adopted, about forty young ladies of a New England town took their woolen spinning equipment to the homes of local ministers and spent the day spinning "after which the minister delivered a profitable discourse." Societies were organized throughout the United States for encouraging home production of woolen cloth, and measures were urged to prevent importation of foreign woolen cloth. Many women fervidly pledged themselves to appear only in homespun dresses, and men, not to be outdone, no longer thought themselves humiliated when seen in homespun woolen stockings and linsey-woolsey suits.

The war, and the long pre-war period of restrictive legislation by England, had made wool growing and the conversion of wool into cloth a large industry for the small, new nation. Not until 1788, was the American woolen industry firmly established. It is a matter of record that the first wool carding machine, installed for local use, was built in 1793 at Newburyport, Massachusetts, and was operated in a woolen mill at Byfield, Rhode Island. When it arrived, it was looked upon as a sign of transition in the woolen industry from the colonial household and handicraft system to modern production, even though it was still housed in a small factory. One of the aftermaths of the Revolution, however, was a scarcity of labor, and whenever woolen mills were established, they found it necessary to employ women and children to a very large extent. Regardless of the age or sex of the members, entire families were sometimes employed in some of the New England woolen mills, and as soon as possible they were housed in company-owned buildings and supplied from company-owned stores. Many mills searched their neighborhoods for young girls to be trained as operators. These girls were boarded in company-owned houses and were chaperoned by a combination matron and time clerk.

Under such conditions, there was little incentive to expand the woolen-manufacturing business beyond supplying local requirements. However, in 1788, the Hartford Woolen Manufactory, organized by a former officer of the Revolutionary War with funds raised by popular subscription, was the first of its size to use water power. General Washington once visited this mill and ordered some of its woolen cloth, as did other prominent men of that period. It was the first mill in America to provide cloth for a president's suit to be worn at his inauguration. This was the suit worn by George Washington on April 3, 1789, and was described as "a fine, dark-brown woolen coat, waistcoat and breeches, which were worn with white silk stockings and shoes with silver buckles." Not only the new president, but also the new vice-president and both senators from Connecticut were clothed in woolen suits made by the same factory. A contemporary newspaper reported: "these clothes were of fine fabric, and so handsomely finished that it was universally mistaken for a foreign manufactured superfine cloth." This was remarkable, since American woolen factories did not have the improved textile machinery which was used in England at that time. Not all presidents at the time, however, chose clothes which were made in northern woolen mills, for their inaugurations. Thomas Jefferson chose woolen cloth made in a Maryland woolen mill "from sheep in such numbers that six hundred acres of land were required to pasture them."

Apparently, the Hartford woolen mill was operated on too large a scale for the era in which it was launched and was not successful. In 1794, it paid its first, and only, dividend in cloth, and in 1795, with one hundred and forty pieces of finished broadcloth on hand, it was sold at auction. The reason given was that skilled labor was scarce, and almost all domestic wool was very coarse, and therefore the mill's product fell short of imported cloth, now quite easy to obtain. A later, and more successful, venture in manufacturing woolen cloth was the Massachusetts Woolen Manufactors at Ipswich, organized in 1792 for the production of broadcloth and woolen blankets. However, about twenty years later it was converted into a mill for manufacturing cotton fabrics.

The one thing that early American cloth manufacturers lacked was a constant source of supply of good wool. The finest-quality raw wool had been imported from Spain, in which country scientific breeding of sheep had been carried on for centuries, but the Ovis hispaniensis, or merino sheep, were practically unknown in the United States. If in earlier days, a few merino sheep had been shipped to the American colonies by Spain, inter-breeding had left no results on colonial sheep. A few merino sheep were later sent as presents from the Spanish Government to prominent American people, including George Washington, Chancellor Livingston, and Irene DuPont of Wilmington, but the comparatively few merino sheep, which had left Spain prior to this time, had been gifts to royal houses, or had been smuggled out. After the Revolutionary War a few pedigreed English sheep had also been smuggled into America, or had escaped the British naval embargo, but General Washington had induced the British Government to permit export to America of a few of the best breeds.

It was not until 1793 that three pedigreed merino sheep reached America. William Foster of Boston, while traveling in Spain, became angered at the refusal of Spanish officials to permit export of "a few specimens of such beautiful creatures," so he smuggled three merino sheep on board his homeward-bound ship, then docked at Cadiz. Upon reaching Boston, he presented them to his close friend, Andrew Craigie of Cambridge, who, not realizing the importance of the gift, had them slaughtered for meat, gratefully thanking the donor for "the thoughtful gift of mutton." Ten years later, Mr. Craigie, then a wool grower, paid one thousand dollars for a single merino ram.

The woolen industry in America owes a debt of gratitude to George Washington for his activity as one of the first men in public office to consider the problems of sheep improvement in a practical manner. In 1792, he stated: "I pay much attention to my sheep, and am proud in being able to produce the greatest quantity of fine wool that can now be produced, but I am not satisfied with this, and contemplate further improvements." He carried out this intention by importing some broadtail Persian rams, but no report of this experiment was published, because Washington died when it was only one year old. Besides that, by this time, the merino type of sheep had begun to appear in the United States, sweeping every other breed into the background.

In "an effort to improve local wool and to render it more fit for superfine fabrics," Irene DuPont accepted the gift of three merino sheep from the Spanish government and embarked upon a sheep-breeding program. By 1812, "the DuPont flock of imported sheep was, perhaps, the best in Delaware." Following the custom of the large importers of sheep in New England, he later erected a woolen-manufacturing plant in the neighborhood, and this action "generated widespread interest in wool growing and woolen manufacturing, in the South."

In what he called "the national interests," Chancellor Robert R. Livingston, United States Minister to France, sent, in 1802, a flock of Rambouillet sheep and six rams from the French National Farm at Versailles, to his estate on the Hudson River. These sheep contributed to the improvement of the quality of American wool, and Chancellor Livingston became so interested in the technique of sheep raising that, in 1809, he wrote his "Essay on Sheep." This was the first American book on sheep husbandry, and as a result of it, he received presents of sheep for "experimental breeding" from interested people.

The further improvement of American-bred sheep was contributed to by a flock of twenty-one rams and seventy ewes, all pure merino-bred sheep which, after long diplomatic delays, were shipped to America in 1802, by Col. David Humphreys, who had retired as United States Minister to Spain after a service of thirteen years. Nine sheep died during transit, and the remainder were sold for one hundred dollars each to farmers in the neighborhood of Col. Humphrey's home at Derby, Connecticut. So great was the desire to build up the flocks of merino sheep on American soil that there was widespread speculation, and by 1804, Derby became not only the first, and for many years the only merino-sheep-breeding center in America, but also the place where almost unbridled speculation in merino sheep was practiced. Here was the New World pasturage for the age-old, wool-bearing animal that, in one form or another, had moved over many feeding grounds for over three thousand years. Finally, the price of a merino ram became "stabilized" at fifteen hundred dollars, and it was reported that in 1807, at Pittsfield, Mass. where Arthur Scholfield owned a small, woolen-cloth factory, "a merino sheep was exhibited under a great elm tree on the village square."

In 1808, President Jefferson, learning of the forced liquidation of large flocks of merino sheep in Spain as a result of the Napoleonic Wars, wrote a letter to Washington Irving, American Minister to Spain, suggesting: "An American vessel proposes to dock at some port in Spain, with a view of obtaining merino sheep to be brought to this country. We desire to emancipate ourselves from dependence on foreign wool, and also to improve the quality of our wool by the introduction of the merino race of sheep." So in 1810, William Jarvis, United States Consul at Lisbon, Portugal, arranged to ship about four thousand merino sheep to the United States, specifying that one ram and two ewes were to be given to Thomas Jefferson, and that others were to be sent to his own home in Vermont. This importation, and another in 1811 which involved twenty-five thousand more, reduced the price of merino sheep to normal when they were offered for sale in nearly every State. In this way, the foundation was laid for substantial production of fine quality wool in America.

However, George Rapp of Virginia, who founded the famous "Co-operative Colony at Harmony, Ind." was principally responsible for the enlargement of a fine-wool industry in America. Most of the herds of Ohio Delaine sheep came from his original flocks. By 1819, these sheep were so numerous that local woolen-cloth mills could be established, and small flocks of sheep could even be sent to Kentucky and Tennessee. By this time sheep farming was prospering throughout Ohio.

Throughout the United States, farmers had discovered the advantage of growing wool, for the demand for it was heavier than usual, because of the embargo on English wool during the War of 1812, at which time local merino wool sold for three dollars per pound. Vermont became the foremost wool-producing state in the Union, and a factory at Newburyport, Massachusetts, wove a suit of domestic broadcloth from Vermont merino wool, which President Madison wore at his inauguration in 1809. William Jarvis, who had retired as a consular officer, and from whose flock wool for the inaugural garments originated, also presented the new president with two merino ewes. The president "soon thereafter purchased four more at one hundred and seventy-five dollars each, as a fund of pure merino blood worth attending to." Even before these additions to his flocks, Madison owned a famous, but small, flock of Algerian (Barbary) sheep, but the wool was coarse. It was to improve this wool that Madison was glad to add these merino sheep to his flock.

The American Embargo Act on foreign products in 1810 gave impetus to local woolen-cloth manufacturing. Until this time, homespun and tweeds had been popular fabrics, but broadcloth, which required fine merino wool, advanced the price of wool from seventy-five cents to three dollars per grease pound. This was a period of great expansion in American woolen-cloth activity, and so great was the demand that the use of power machinery completely eclipsed household cloth-making activity. When, in 1815, the war with England ended, British woolen goods were again offered to American buyers. This gradually forced down the high prices of raw wool, and sheep raising did not again become profitable until the "Clay Tariff" of 1828 protected American wool growers and woolen-cloth manufacturers.

America has obtained her sheep from nearly every country in Europe and today possesses nearly every variety. Importations have improved American flocks, but those first few "mutton sheep" of Virginia and Massachusetts were the foundations of stocks bred on the Atlantic seaboard for over three and one-quarter centuries.

On his second voyage to America, Columbus brought with him a few commonly bred "mutton sheep," and these were the first domestic sheep to appear on American soil. The purpose was to stock his headquarters at Hispaniola (Santo Domingo), in the West Indies, and on this island was laid the foundation of the vast flocks of sheep which ultimately roamed the plains and valleys of the American southwest.

.Unlike the English, the Spaniards were not originally interested in colonizing their newly discovered territory but were frankly and solely concerned with locating gold and other precious objects for reshipment to Spain. To accomplish their purpose, they organized large search parties which often remained in the field for periods as long as three years. No tour of exploration, nor military campaign, was planned that did not include large flocks of sheep to be used as food for the personnel of the expedition. However, when colonization was finally undertaken, several royal sheep ranches were established, and as the Spanish population increased, expansion of the sheep-raising program quite naturally followed. Not only did Cuba, Puerto Rico, Trinidad and other Spanish-ruled islands maintain their own flocks of sheep, but when, after much difficulty, Cortez obtained a foothold in New Spain (Mexico), he too immediately sent to Santo Domingo for a large number of sheep, mixing them with a few pure-blooded merino sheep that he had brought from Spain.

Nearly eight decades before sheep were brought by English colonists to Jamestown and Plymouth, Spanish conquistadores had brought flocks of sheep into what is now the American southwest. In the spring of 1541, the Spanish viceroy in Mexico ordered a large expedition under Coronado to cross the Rio Grande and travel north, in search of the "Seven Cities of Cibala," the fabulous cities of gold. For food, they brought along a flock of about five thousand sheep, many of which were captured by the Indians who impeded the expedition for over three years. Other sheep perished, due "to traveling through the roughness of the rockes," as Cortez reported to his superiors. When the expedition finally reached a point near the present site of Dodge City, Kansas, it was reported by Coronado that only twenty-eight sheep reached the destination. These were left under the protection of some friars who were later killed by Indians, and there is little doubt concerning the fate of the sheep. Seventeen years later, in 1558, a flock of churro, or common Spanish sheep, was driven across the Mexican border into the American southwest, and this flock, later bred with finer sheep, ultimately produced a distinctive American breed.

FIGURE 4

Carved Pueblo Mountain Sheep, Circa 1350
(Courtesy of Laboratory of Anthropology, Santa Fe, New Mexico)

The famous Spanish expedition of 1598, under Juan de Onate, was the real beginning of the American southwest. After a few preliminary failures, this venture finally became established as a combination military, missionary and colonization project. Juan de Onate, not well enough known to American historians considering his importance, was quite familiar with the type of country he was destined to conquer and colonize and was therefore selected by the viceroy of Mexico to succeed Coronado, in a new attempt to establish Spanish colonies north of the Rio Grande. His original expedition numbered four hundred prospective colonists including Jesuit and Franciscan friars, and they brought three thousand churro sheep along with them. Using what is now known as psychology, Onate shrewdly presented small numbers of sheep to each roving band of Indians which he encountered, and not only won their friendship, but indirectly taught them semi-nomadic habits which led to the development of a pastoral form of life.

Spain lacked a sufficient number of dissatisfied citizens who were willing to leave their native land to face the hazards of colonial life in her vast possessions. However, barring warlike Apache and Comanche tribes, she was able to colonize the Indians. Her friars and Christian brothers taught them to convert raw fleece into woolen cloth, as the Spaniards had done in Mexico as early as 1560. This was not too difficult, as Indian tribes, such as the Pueblos and Navajos, had, for centuries, spun and woven wild cotton and such loose hair fibers as they were able to gather. The padres brought out the fact that a dead cow or steer could yield only one hide for a garment or moccasins, whereas a living sheep could yield wool year after year. The Indians soon became so eager to increase their flocks that inter-tribal quarrels broke out, and it was the padre who, with crucifix, missal and rosary, restored order. The missions maintained by these friendly priests were usually well fortified against ordinary uprisings and were also industrial schools equipped with agricultural tools, spinning wheels and hand looms. The training in both field and school eventually made hundreds of Indians self-supporting and opened the vista of a civilized form of life to them. This quiet, peaceful arrangement created a pastoral existence for a still semi-wild people and promised a hopeful future.

However, back in the minds of many of the acquisitive Spanish leaders was the age-old urge for gold. This resulted in an attempt to exploit the Indians. Rotating bands of Indians were conscripted to work in tunnels in the mountains in search of the precious metal. This free work the Indians continued for over half a century. However, in 1680, they organized a general uprising, driving the Spaniards out of the country and destroying all of their property, except the flocks of churro sheep which they carefully guarded and afterwards developed into a better type of sheep. This turn in events changed the habits of many southwestern Indian tribes for the next three hundred years. All records confirm the statement that these Indians were far more interested in wool than their Spanish overlords had been and that the Indian pattern of life was well suited to the semi-nomadic existence of the shepherds. As a result of this, sheep have been preserved in the southwest for over four hundred years, but for a long time, there was no endeavor to improve the original churro type introduced by the Spaniards.

Under the Spanish régime, sheep were the staple stock of the southwest and Old Mexico was the most important customer. It was reported that, at the peak of this traffic about five hundred thousand sheep were annually driven to that country, where they were often sold at from fifty to seventy-five cents each to wealthy operators who resold them at a high profit. A large quantity of inferior, coarse wool was also produced, and this, when not used by the Indians, would be shipped to Mexico where it would be converted into blankets. As late as 1849, when gold was discovered in California, churro sheep were driven to that State to enlarge the small local flocks. The flocks raised by the Mormons, after they had settled at Salt Lake City, originated from these sheep. After the Mexican War, small flocks of almost pure merino sheep from as far away as Vermont, Wisconsin and Ohio were brought to the southwest, either by land or river boat, by settlers in the new American territory. The intermingling of these flocks with native stock also contributed to improvement of fleece.

Converting churro sheep into wool-bearing animals began about 1800. It involved the loss of almost all of their original characteristics except a rugged constitution and an ability, like the merino, to travel long distances in compact flocks. The important sheep of the southwest today are the result of these efforts to improve wool. However, crossbreeding progressed so slowly that sheep raising, exclusively for wool, did not develop to any great extent in the southwest until about 1862.

# WOOL IN PERU

THE INCAS OF SOUTH AMERICA lived in the high, dry sections of the Andes Mountains and although they originally owned no sheep, they had small animals of the camel family, from whose fleece they collected fine wool, colored either tan or gray. This wool came mainly from the llama and alpaca, which had long been domesticated, and occasionally from the vicuna and guanaco, which had never been tamed. These fleeces were spun and woven by Inca craftsmen much in the same manner as any fleeces were by other ancient people throughout the world. They also made double cloth fabrics of diverse weaves, decorated with colored threads to produce embroidered designs.

Ply yarns appeared very early in primitive spinning, for yarn was first used as a cord, and the strength value of the ply was clearly understood even centuries before the use of spun fibers for cloth weaving. Doubling and twisting of wool fibers reached remarkable perfection in Peru, and although wool fiber used in cloth was normally two ply, yet three, four, and in one instance, seven ply were used. The woolen and hair textiles of ancient Peru, included not only every type of weaving known to modern textile craftsmen, but also some weaving patterns that are not yet understood. The puma appears so frequently in Inca textile design that it is believed these ancient people looked upon this animal as sacred, much as the cat was deemed sacred in Egypt.

Inca weavers were not permitted to own raw material, nor could they sell the cloth they fabricated. All raw fleece was owned by the public and was carefully inventoried. Knotted wool and hair cords, which the Incas called quipas, recorded a specific quantity in storage, while still another type of knots represented a different number. In this simple manner official store-keepers kept a fairly accurate record of raw wool, and if in any locality a shortage developed, raw wool was drawn from another district which, as shown by its quipas, had a surplus over local requirements. Excess finished cloth was distributed to workers who devoted their own time to producing food and other necessary community supplies, any excess of which, they, in turn, distributed among the cloth weavers and other community workers.

Like all other Inca productive activities, cloth weaving was carefully organized so that there would always be work for the specially trained weavers and sufficient clothing for the people. Without official permission, no worker could move his home to another locality, nor could he change his vocation. If anyone was found hungry or in want, the district official was severely punished. Natives, who lived in the mountains, brought their flocks to a central point for shearing and delivered fleece of such wild animals as had been trapped for that purpose. When shearing had been completed, the natives would return to the mountains with their flocks, bearing food exchanged for fleece they had contributed. After the central storehouse had been filled with wool, an official would estimate the amount of cloth necessary to supply the public with clothing and the extent of work that could be expected from cloth weavers. The raw wool was then apportioned in accordance with this survey, and after the cloth had been woven, it was distributed to people who had busied themselves with other productive duties.

The Inca ruler, himself, wore garments woven from the finest vicuna wool, and, because he was looked upon as a god, the fairest maidens of the land were trained to weave these sacred mantles in the temple. They were kept busy at this task, because the Inca wore a garment only once after which it was placed in the royal storehouse. Some of these garments, made from cloth which had 270 threads to the inch, were for tunics, over which, on impressive occasions, he wore a cloak made of feathers from the macaw and the toucan.

So far as can be determined the Incas of Peru did not use slave labor, but the conquest of that country by the Spaniards placed these intelligent people, themselves, perilously close to that category, although the conquerors taught Christianity, which the proud Inca chieftain, Astahualapa, said, meant oppression.

In 1533 Pizarro, the conqueror of Peru, reported that the art of weaving wool in that land had "reached a perfection greater than the best cloth making in Spain," and although there is usually a vast difference between linen and woolen woven fabrics, yet archaeologists have noted the striking resemblance between Peruvian woolen cloth and linen textiles found in Egyptian tombs. In both instances textile artistry had reached a high level.

Sheep were first introduced into South America by the Spaniards who originally imported mutton sheep to supply the Spanish commissary. In 1550, a few merino sheep were sent to Peru by the Spanish Colonial Government, but the climate modified the original type, and they soon deteriorated. As sheep gradually penetrated into distant points, both north and south, they changed the habits of comparatively uncivilized natives, many of whom, like men of the Old Stone Age, became herdsmen and depended less and less upon hunting for food and clothing. These primitive people learned to weave cloth for blankets and performed such perfect work that these blankets would shed water. These and other important steps were taken by isolated Indian tribes in South, Central and North America. Some of these tribes had heretofore been ignorant of textile crafts, although others, like the Incas, had long been excellent weavers.

# WOOL IN AUSTRALIA

LIKE NORTH AMERICA, Australia had no native sheep, but a few hardy pioneers, who, very early in that country's history, had migrated there from England, "engaged in pastoral pursuits," and by 1780, a few sheep were to be found in the new colony. In 1788, however, Governor Phillips imported the first sheep to come from the Cape of Good Hope. They were of either Dutch or Bengal (India) origin, with hair-like fleece and fat tails, more suitable for food than for wool production. Following this initial consignment, nearly every ship arriving from the Cape of Good Hope brought its quota of "Cape Fat Tails" to Australia, but the few sheep, which survived the various journeys, did not live very long after reaching land.

In 1789, Australian colonial authorities sent Captain Waterhouse to the Cape of Good Hope with instructions to obtain sheep of a better breed, and as a result of his mission he returned with thirty-two pure-blooded Spanish merino sheep of which twenty-nine survived the trip.

Captain Macarthur, an army officer, was the first man in the colony to cultivate land on a large scale. The captain had gone with his regiment to Sydney, Australia, two years after the colony had been established, and within a short while reported "a petty population established at so vast a distance from other civilized parts of the globe, can have no prospects of ultimately succeeding unless, by raising as an export some raw material which can be produced with little labor, be in considerable demand, and be capable of absorbing the expenses of a long and costly voyage."

The commodity, in his opinion, which was most likely to fulfil these requirements, was wool. He immediately acted upon his theory. Among the original live stock on his large farm were thirty rather coarse, hairy Bengal sheep which had been purchased at Calcutta, India. However, there was a delay of three years before they were delivered to Sydney. Upon their arrival, the captain remarked that the animals were "no great prizes, but skinny, long-legged razor-backed sheep, with not an ounce of anything approaching wool upon them." Nevertheless, he cross-bred these sheep with one or two Irish rams which he was able to purchase and then reported "the fleece then became distinctly less like hair, and increasingly like wool." In 1794, he made the observation, "there were only 526 sheep in Australia," but it had been demonstrated, at least to the satisfaction of Captain Macarthur, "that the Australian climate and soil had been responsible for improvement in fleece."

In 1797, Captain Macarthur, as an agent for a local movement "to establish the production of fine wool in Australia," purchased two merino rams and four ewes from a flock of sheep imported from the Cape of Good Hope by Captain Waterhouse, and later was able to send to the Cape for eight additional merino sheep for each of which he paid an amount equal to seventy-five dollars. He kept this group of merino sheep separated from his ordinary flock and carefully supervised their breeding. The results he obtained convinced him that Australia had a great future as a sheep and wool country. It was through his influence that, ultimately in every district of Australia and Tasmania as well, merino sheep and their type of wool became world famous.

Firmly convinced that sheep culture could be successfully undertaken in Australia, Captain Macarthur realized that if the infant industry was to be developed in earnest, interest in it should be aroused in London, the largest wool market in the world. So in 1803, he visited London, taking with him samples of Australian merino wool. He urged the English government to assist him in his plan to colonize Australia by means of sheep raising. Obtaining a "grant of pasturage," he promoted "The Pastoral Company of English Investors" to aid him in making his plan work. He not only succeeded in interesting London wool merchants, but, of more importance to the plan because of the publicity, he even returned to Australia with five rams and one ewe, from the royal flock of pure merino sheep. These sheep were destined to have a profound influence upon sheep husbandry in Australia.

While the early flock masters were developing the sheep industry in Australia, great changes were taking place in the English wool market which had been an important prop of English economy ever since the Middle Ages. After the Napoleonic Wars, the English wool trade began to decline, for English-grown wool could no longer successfully compete with cheaper foreign wools in the world's export markets. At times it could not even hold its own against foreign competition in the home markets. Just at the right moment, increasing quantities of Australian-grown wool reached the London market. The first commercial appearance of fine Australian wool was a consignment of only two hundred and forty-five pounds in 1807, but London wool merchants eagerly paid high prices for it. The first English auction of Australian wool occurred in 1821 when three hundred and twenty nine bales, shipped to London by Captain Macarthur, brought high prices.

It was the Merino Society of London, formed in 1814, that firmly established the merino breed of sheep in Australia. The English Parliament had authorized a reduction in import duty on foreign wool, and this meant that a little profit was possible during the time lag necessary to successfully cross-breed imported merino sheep with animals of local origin. However "it was a relief to all parties when it was found that in the Australian colony, sheep could be successfully acclimated."

Year by year, increasing quantities of Australian wool arrived in England and, simultaneously, the quality improved. By 1828, England admitted that Australian wool was longer, softer and more resilient than even the best English and Silesian wool. Moreover, Australian wool was peculiarly suited to use in the woolen cloth then in demand.

The 1830's marked a rapid expansion of the Australian wool industry, for it had become a national effort, and "it seemed that every citizen of the land dreamed of nothing but sheep." The cry was "put everything in four feet," and Australian export of wool to England alone increased from four million pounds in 1835 to thirteen million pounds in 1842. Today, with nearly one-sixth of the world's sheep, Australia produces between one-quarter and one-third of the world's wool. It is this industry which has made possible the rapid advance of Australia during the past century.

# CASHMERE

When the civilized Western World found a protective covering in the fleece of sheep, the people of the Eastern World used fibers of other fleeces and also of some fur-bearing animals, which were either native to that area or had been introduced during the early migrations of man who, accompanied by his flocks and herds, invariably moved westward, searching for a better and safer life. The fibers of these various animals had much in common. They were similar in physical structure, fineness of filament, length and softness, and all were widely used in conjunction with sheep wool, for they called for similar textile processes.

Among these animals was the Cashmere goat, or goat of Tibet, which, although not as amenable to domestication as sheep, was widely cultivated for its fiber. Down through the ages, the word "cashmere" has always been associated with fleece of rare beauty, both costly and highly prized.

The origin of domesticated and semi-domesticated goats, whether Cashmere, Angora, Kurd or common milk goats, is shrouded in mystery. It is believed that they are descended from the wild Pasang or Grecian ibex (Capra aegagrus), which at one time roamed from the hills of Greece through Asia Minor to Mongolia but today are confined to Turkestan and Northern India. When and where this goat was domesticated has never been ascertained, but it is known that fleece of the Pasang type of goat was used by Swiss Lake dwellers.

The original home of the Cashmere goat seems to have been the Himalaya Mountains. It is a relatively small, hardy animal, with straight horns, which from ancient times has lived in the cold, high altitudes of the Himalayas and the high plateaus of Tibet. This goat is now bred in the more rugged areas of Persia and from the Kashmir district of India to the Caspian Sea. The Cashmere goat is not normally bred in large numbers in its native habitat. Unsuccessful attempts have been made to breed this valuable animal in Europe, particularly in France about 1820, but at best it is only semi-domesticated, and it has been found to be impracticable to attempt to acclimatize it to any other than its natural habitat. It is true that in some countries remote from its natural habitat, this animal has survived, but it has been at great sacrifice of the quality of its hair.

The choicest Cashmere fleece is still grown by animals living in regions of perpetual snow, for in such surroundings the fine, fleecy undercoat, locally known as pashm, grows most thickly and luxuriantly. During the winter season its fleece consists of an outer coat of long, straight, coarse hair, which affords protection to the animal against snow and ice but has little textile value. At the roots of this outer coat is an undercoat of soft, downy, short, wool-like fleece which is the valuable Cashmere wool of commerce, also occasionally known as Tibet wool. In beauty and fineness of texture it ranks next to vicuna as one of the most beautiful animal fibers used by man. When bred with Angora goats, the Cashmere goat produces a soft, fine wool that is longer and more abundant than that of a pure breed of Cashmere goat. Each animal yields a very small quantity of fine fleece, and contrary to the normal conditions in fleece- and fur-bearing animals, it is the male Cashmere goat that provides the greatest amount. He yields approximately four ounces, whereas the female yields about two ounces.

This limited volume of raw fleece results in high prices for various Cashmere woolen products. It requires the complete annual yield of about forty Cashmere goats to produce sufficient material for an overcoat of medium size. This wool is never sheared, for these semi-wild animals will not permit clipping as practiced with most goats, but each animal is frequently combed during the shedding season in the spring. This process requires many days of patient effort, to obtain as much as possible of this fine fleece. In this process some of the longer hair is mixed with the fleece, and they must be separated by a long and tedious hand process. In spite of great care, a small quantity of this dark hair becomes embedded in the fleece, and in a peculiar manner contributes to the characteristic tone of Cashmere yarn. The natural color of the fleece varies from an extremely pure white, to a grayish hue, to a brown-gray tone. The quantity of white fleece is as small as 20% of the entire lot. The average staple is from one to three inches in length and shows scales characteristic of the wool type of textile fiber, but these scales appear to be in sections placed within each other. This peculiarity accounts for the warmth-giving quality of this fleece.

Today the bulk of Cashmere fiber comes from India and China. It has been noted that poorer grades of wool seem to come from western parts of mountain ranges, and that the quality becomes better the farther east the animal roams. The best grade comes from Western China near the border of Tibet, a section where the Cashmere goat comes nearest to being domesticated because it finds congenial climate and forage. An inferior grade of fiber, known as Persian cashmere, comes from Iran. It is a peculiar fact that, although the use of Cashmere wool for fine fabrics has been known for centuries, yet all wools from India were once classed as carpet yarns. All breeds of Indian sheep and goats yielded a form of hair rather than wool, for originally these animals were raised for mutton, and for a long time fleece was of secondary value.

Europe and America first learned about Cashmere in the form of beautiful, light-weighted shawls. India had long been famous for these shawls and other fine Cashmere fabrics which, with good reason, have been passed from generation to generation, for Cashmere is one of the softest, smoothest and most beautiful fabrics of the Orient.

Early references to European trade in Cashmere shawls of India also tell of an unusual wool from a sheep known as Biangi, found only in those high regions lying north of the Himalaya Mountains, and describe it as being remarkable for the softness and length of its fiber. These hill sheep were strong, robust animals, but very little was done to improve their strong and substantial fleece. No attempt was made in India to introduce scientific sheep breeding, for this activity was in the hands of local shepherds who were both conservative and poor. It is even suggested that there were religious scruples against such procedures.

# MOHAIR

Mohair is the long, curly, normally white fleece of Angora goats, native to the province of Ankara, Asiatic Turkey, where it has been domesticated for over two thousand years, and from which the name of this goat is derived. The word "mohair" comes from the Arabic "mukhayyer" which means silky.

The use of mohair for manufactured fabrics has extended back for many centuries. Old Iranian texts speak of fine, silky goat's hair, and even prior to this, mohair was undoubtedly referred to by Moses, when he called for a mixture of this type of hair with fine fibers to be made into altar cloths for the temple. It is thought that Swiss Lake dwellers of about 4000 B.C. used mohair fiber which they obtained from flocks of Angora goats, undoubtedly descended from animals brought to Europe before the Swiss Lake dwellers arrived.

The origin of the Angora goat is shrouded in uncertainty. Some authorities think that it may have been a result of cross-breeding the wild markhor, or Capra falconeri, with the European ibex, or Capra alaina. It is believed that these earlier types of animals freely interbred with the Pasang, common ancestor of most, if not all, domestic goats. The Angora goat inhabited the hills of Western Asia. We have no accurate records of how early this goat was domesticated, but it is correct to state that it has been known in many countries of Western Asia since ancient times.

During the warm season, this fairly large animal grows short, wooly fleece of grayish-white, which in winter is covered with larger and even more lustrous hair. The staple is from eight to twelve inches long and represents one year's growth. The length varies according to the districts in which the animal is raised. The Angora goat, however, has now been bred so that it grows only one type of fleece, and the coarse outer hair is almost completely eliminated. The fleece is clipped only once each year, and the fibers are often sixteen inches long.

The characteristics which make mohair such a valuable textile commodity are its staple length, strength and soundness, combined with a natural springiness, and with little inclination to felt. The fiber is soft and silky to the touch and has an excellent luster. However, mohair takes dyes very poorly. This is probably due to the fact that the bulk of the fiber is composed of a medulla, or hollow, running the entire length. This fiber element is filled with air and sometimes has numerous cross walls, all of which resist dye impregnation. Notwithstanding its negative dyeing receptivity, the general properties of mohair fiber make it a highly desirable raw material for a wide range of textiles. It is especially favored for fabrication of plushes, imitation furs and astrakhan, and its coarse hair has long been converted into blankets and carpets. Although it is more uniform in diameter than wool fiber, its comparatively smooth surface has practically no serrations and its indistinct scales do not project from the shaft as is the case with wool fiber. Therefore, mohair will not shrink or felt as readily as wool.

Even today, the highest grade of mohair fiber originates in Asiatic Turkey, which, at one time, was the only important producing area. However, in 1554 the Angora goat was introduced into Europe from Asia Minor, and since that time many attempts have been made to establish a mohair industry, but nearly all have resulted in failure, although for many years Angora goats were bred with fair success in Spain and France. In 1835, England began spinning mohair yarn, and for a few years, machine-made mohair yarn was so superior to handmade Turkish yarn that export of that commodity from Turkey almost ceased. With this single exception, mohair yarn made in Europe deteriorated from its traditional quality. This condition can be traced to an unusual demand for mohair fabrics, which, for about forty years following the Napoleonic wars, called for greater volume of mohair fibers and led to the cross-breeding of Angora goats with Kurd goats, a species characterized by long, coarse hair mainly suitable for tents and bagging.

In 1838, Angora goats were introduced into South Africa, by way of the colony of the Cape of Good Hope, and were there raised either as a pure strain or crossed with native African goats. In the course of time, a very desirable type of mohair was produced, which, in volume and value, approximated the normal yield of Asiatic Turkey.

Pure-bred Angora goats were introduced into the United States about 1849 and found their way to farms and ranches in Oregon, California and Texas. In Texas, large quantities of mohair are harvested annually. In less than one hundred years, the United States has become one of the principal mohair-producing countries of the world and uses more mohair fiber than any other country. American mohair fleece, which is clipped twice each year, has an average length of from six to eight inches.

# CAMEL

OF ALL SPECIALTY FIBERS used by man, undoubtedly the best known is camel hair. In a broad sense, it is the undercoat of the modern Bactrian, or two-humped camel, and is rougher than sheep's wool but softer than goat's hair.

Strange as it may seem, a large part of the ancient history of camels took place on the Western Hemisphere, and much of it in what is now the western part of the United States. About fifty-five million years ago, there developed a small animal, called the trigonolestes, about the size of a gray squirrel, and with this small animal began a long series of evolutions through which, it is believed, the procamelus developed. This latter ancient animal is accepted as the common ancestor of the present-day camels of Asia and Africa, and of the cameloids of South America. The fact that these animals were unknown in ancient Egypt and Europe seems to confirm the impression that their evolution finally terminated in Asia. It is believed that an ancient form of procamelus lived in the western part of the United States until the advent of the first Ice Age, about one million years ago, and that climatic conditions became so unsuitable to them, that they dispersed. Some migrated across a then existing land bridge from Alaska to Siberia, while others roamed southward to South America to become the cameloids of the Andes Mountains.

The procamelus that reached Eastern Asia underwent further development which resulted in two types of modern camels. One is the one-humped dromedary of Egypt, Syria and Arabia, which grows hair to withstand intense heat, but

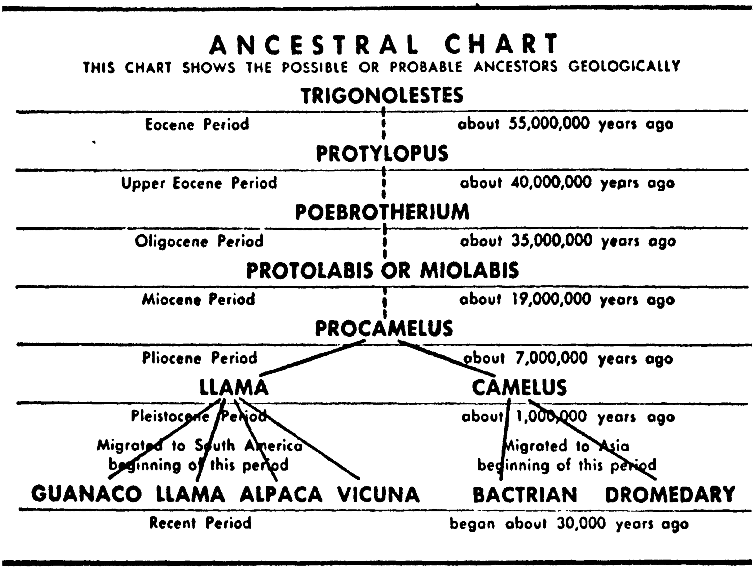
ANCESTRAL CHART
THIS CHART SHOWS THE POSSIBLE OR PROBABLE ANCESTORS GEOLOGICALLY
TRIGONOLESTES
Eocene Period
about 55,000,000 years ago
PROTYLOPUS
Upper Eocene Period
about 40,000,000 years ago
POEBROTHERIUM
Oligocene Period
about 35,000,000 years ago
PROTOLABIS OR MIOLABIS
Miocene Period
about 19,000,000 years ago
PROCAMELUS
Pliocene Period
about 7,000,000 years ago
LLAMA
CAMELUS
Pleistocene Period
about 1,000,000 years ago
Migrated to South America beginning of this period
Migrated to Asia beginning of this period
GUANACO
LLAMA
ALPACA
VICUNA
BACTRIAN
DROMEDARY
Recent Period
began about 30,000 years ago

FIGURE 5

Camel Ancestry Chart
(Courtesy of Dr. A. C. Whitford)

the hair of a type so thin and coarse that it is not suitable for textile purposes. The dromedary, itself, was developed in two forms, the first being the djeml, or baggage carrier, and the second, the mehari, or saddle camel, used for travel and racing. The other type of ancient camel was the original two-humped Bactrian camel, so named from Bactriana, as Bokhara, a province of Afghanistan, was anciently called. This camel was used in Tibet, Mongolia and North China. It is covered with hair for protecting it from extreme cold. So, there were camels of two types, each capable only of restricted travel as burden-bearers, for the dromedary was nervously allergic to cold, and the Bactrian could not withstand heat.

However, in Bokhara, a district in which the Bactrian camel seems to have thrived, there eventually appeared a cross-breed between the dromedary and the ancient Bactrian. This animal, the modern Bactrian camel, is a two-humped, shaggy animal, which grows insulating hair, and which the natives call "Boghdi." Its hair possesses the dual purpose of retaining warmth in the cold and retaining coolness in the heat, so that it can withstand both the icy winds of the Himalaya Mountains and the scorching sun of the Syrian desert. This valuable characteristic of Bactrian camel hair is not lost during its processing into cloth. These camels are far more numerous than are the dromedaries. The thin, coarse hair from the latter camels has never, to any great extent, been used for textiles, but the hair from the Bactrian camels is the highly prized camel hair used for clothing and other quality textiles.

The Bactrian camel inhabits almost the entire Asiatic Continent from Siberia to the Arabian Sea. The word for camel is the same in the languages of Egypt, Persia, Arabia and Syria, and in most of these countries, camels form part of family wealth. It fulfills a primary mission as a beast of burden by carrying loads of from four hundred and fifty to twelve hundred pounds, for as long as sixteen hours per day, at a speed of about three miles per hour. Its valuable hair is of secondary importance, although it provides an additional source of income to its owner. It feeds chiefly on the bitter plants of the steppes, forage that is refused by most other animals, and it has a curious partiality for salt, drinking freely of brackish water and salt licks. The best breeds of Bactrian camels are found in Western Mongolia where good pasturage, favorable climate and intelligent care have combined to develop an exceptionally fine hair.

The first European to study the importance of using hair from the Bactrian camel was Captain Thomas Hutton, an English army officer in India. During his investigation of the age-old cross-breed which produced the "Boghdi-Bactrian" hybrid type of two-humped camel, he found that, for several thousands of years, its shaggy fleece had possessed a rare combination of heat-resisting, cold-resisting qualities. In commenting upon the large droves of these camels owned by natives of Bokhara, Captain Hutton told the East India Company that "long ago the natives had obtained an animal capable of enduring alike the heat of summer, and the snow of winter."

Camels are temperamental animals and will not submit to shearing. Camel hair is plucked when, once each year, during the moulting season in late spring or early summer, a year's growth of winter hair on the animal's neck and upper limbs becomes loosened to make room for new growth and hangs in strands; or the hair falls off of itself in clumps. This is gathered by camel boys who, when the caravan is on the march, usually trail behind to pick it up and place it in baskets carried by the last camel in line. More is collected when the camel is at rest for loose hair is rubbed off at night while the animal is grazing. In some sections, camels are actually plucked to obtain the underhair, before the animal has almost completely lost his old coat by moulting. The average hair and wool yield per animal is about eight pounds, and when the crop is completely gathered, it may be sold to an agent encountered along the way or forwarded to a collection center for sorting and grading, prior to sale.

The Bactrian camel grows two types of hair. The outer hair is long and very coarse, and is used by the natives for ropes. In this connection, there have been suggestions by etymologists that the word "camel" as used in reference to "passing through a needle's eye" may have referred to a rope made from camel's hair, commonly used by all Oriental people. The inner coat is soft, curly and silky, and is the fine wool used in the best fabrics. This wool has a delicate shade ranging from brownish-white to yellow and even a dark red. Camel hair is mostly used in its natural colors, as it is difficult to bleach. It not only possesses 50% more insulating value than wool but absorbs less moisture than any other fiber, affording exceptional warmth in damp, cold weather. After the fleece has been combed to remove all coarse hair, the curly, soft fibers, usually about two and one-half inches long, are segregated for textile use, either by themselves, or in combination with sheep wool.

Camel hair has been utilized since time immemorial for the fabrication of fine textiles. For hundreds of years, camel-hair shawls have been noted for their beauty, extreme lightness, softness and fineness. These ancient shawls were handmade from the finest "down," and, as this was a laborious task, only the very wealthy could afford them. They were known as shawls made from "Baruk Shootur-i and Joormuck" by the natives of Bokhara. Until nearly the middle of the 19th century, when camel hair was introduced into Europe and America, the knowledge of these shawls was confined largely to those nations closely bordering upon China and Bokhara. Prior to the introduction of camel hair into Europe and America, besides being made into shawls, a considerable amount was exported to Amritsur in the Punjab, and much was also sent to Russia where it was made into a cloth known as "salatiska," which was used in the manufacture of uniforms for high-ranking officers. It should also be recalled that the famous rugs made by the Yomuds, the northernmost tribes of the Turkomans, were and are often made from camel hair. The strong knee-hairs are used for the warp threads and the soft underwool is utilized for the knot threads. All of these pile carpets are knotted with sometimes as many as four hundred fifty knots per square inch. These rugs are still sold as "Bokhara rugs" although not one of these Turkoman rugs is made in Bokhara.

# LLAMA

THERE ARE ACTUALLY four varieties of the llama, New World species of the camel family.These are: the true llama, as described in this chapter, the vicuna, alpaca and guanaco, each separately described.

True llama wool is obtained from the Llama Glamma Glamma, an animal indigenous to the high altitudes of the Andes Mountains of Southern Ecuador, Bolivia and Peru. Like the other members of this species, this animal prefers high, rugged mountains and is practically never found in the lowlands. In recognition of their intermediate status between sheep and camel they have sometimes been called camel-sheep. They are the largest member of the American cameloid family, being about the size of a deer, and often weigh as much as two hundred and fifty pounds. Although much smaller and without humps, they possess many of the characteristics of the Old World camel.

Llamas of South America are both wild and domesticated. Ever since early pre-Inca times, these aristocratic, temperamental animals, like their Old World cousins of Asia, have been used primarily as pack animals, being the traditional burden-bearers in the wild, rugged country they inhabit. Incidentally, they are the only American wild animals ever to be trained as burden carriers, and they have proved invaluable, for they are able to live at altitudes of more than two and one-half miles above sea level, without being subject to mountain sickness, as are horses and mules. The usual load carried by these animals is about one hundred pounds, a weight seemingly fixed by the llamas themselves, for if a heavier burden is placed on an animal's back it will immediately lie down and, even under severe punishment, will refuse to budge until the load has been reduced. All llamas seem to know instinctively when the weight limit has been reached. These animals climb the slopes of the Andes Mountains at a rate of from fifteen to twenty miles per day. The cost of their maintenance is practically negligible, for they feed on twigs and herbage found along the way.

Although at no time in its history was the llama primarily bred for its fleece, yet the female animal was sheared at intervals of from two to five years and yielded about 8½ pounds. The hair of the female is finer and cleaner than that grown by the male. The male animal was seldom sheared until its death, which might occur at an age of from ten to twelve years. The reason for not shearing the more important burden bearer was to permit the hair to grow on its back and thus form a cushion for the burden.

Like the guanaco, the llama has two types of hair, a long, thick, coarse outer coat which abruptly terminates along the lower line of the body, and a fine wooly undercoat which grows close to the flesh and resembles alpaca hair. The characteristic outer fiber resembles mohair and is useful for mixing with alpaca hair. It was long used by natives for articles like blankets and sacks and was also suitable for coarse or knitted fabrics. This fiber has great strength, and because of its shellac-like surface, it is also highly water-repellant. In addition, it has excellent insulating qualities and is therefore an almost perfect natural protection against extremes in temperatures. However, very little of this particular hair ever reaches the market in textile fibers.

The color of these fibers varies from white to shades of cream, gray, fawn, brown and even black, the color pigments being more or less collected in well dispersed globules. Hair of the various colors may be woven separately, or selected colors may be blended either in yarn or fabric. Thus a number of shades and patterns can be obtained in the finished cloth without the use of dyes.

# GUANACO

THE GUANACO, Llama Glama, is a wild mountain animal that yields wool of varying quality. It is the common progenitor of the llama, vicuna and alpaca, as well as the modern hybrids of those animals, and is probably a modern representation of an ancestral form of the American camel which migrated to South America. Its early form, as evidenced by bones found in caves in Southern Chile, along with a prehistoric horse, shows that it was a comparatively large animal about the size of the llama of today but, at present, is only about one-half of its original size.

Many years ago, the guanaco was spread all over the western part of South America from Ecuador to Terra del Fuego. Although a few guanaco still remain farther north, yet they are now largely confined to the Cape Horn region of Chile and Argentina, where they provide natives with clothing, footwear and food. Their meat, however, is dry and stringy. This relatively scarce animal is extremely wild and very timid, and, like its northern kin, the vicuna, must be killed to obtain its fleece. Guanacos have never become domesticated and, therefore, cannot be sheared. Because of this, their beautiful fiber is scarce and not of great importance commercially.

The guanaco normally grows to a height of about four feet. It is similar in appearance to the llama, but its back is more arched, and its body is less tapered. An early explorer of the southern tip of South America described the guanaco as having "the neigh of a horse, the wool of a sheep, the feet of a deer, and the speed of a devil." Its shaggy coat is usually a dark chestnut brown, but occasionally a white-haired animal has been found. This fiber is extremely slender, lustrous and peculiarly adapted to textile uses.

The history of this animal and its allied types is very interesting. Since Inca days, they have been important in the economic life of the countries they have inhabited. Their fleece has been a source of fibers for fine fabrics ever since the Incas made elaborate cloths which are the pride of museums. It should be remembered that these textiles were made entirely by hand, and that they called for the utmost patience and skill.

Guanaquito, the fiber grown by the baby guanaco, although extremely scarce, is a magnificent textile fiber. After the animal is killed, the hair of the guanaquito is plucked. It has found a sizable place in the textile markets, as it can be dyed various shades.

# VICUNA

THE VICUNA, Auchenia vicugna, the smallest member of the camel-sheep group of South America, is a rare animal, yielding the finest of all wools which is converted into the world's most costly and exquisite cloth. It is the wild relative of the alpaca. Although scientifically classed as a type of camel, these animals resemble goats in appearance and behavior and for many centuries were considered as such. The vicuna is one of the wildest of animals known, swifter than an antelope and more agile than a mountain goat. It has an almost unnatural ability to disappear quickly from sight whenever threatened with danger, and few vicunas have ever been captured. Many attempts have been made to domesticate this valuable animal, and even to cross-breed it with its near relative the alpaca, but results have been negligible. It is less than three feet in height, making it a little taller than the average sheep, and it weighs from seventy-five to one hundred pounds. Both of these properties contribute to its characteristic graceful movements. In shape and agility it closely resembles the gazelle of East Africa, but its fleece is a golden chestnut, shading off to a delicate fawn-color, with strands of long, white, beard-like hair, which fall down below its forelegs.

The vicuna travels in small herds, the unit consisting of a single male and from six to twelve females. This more or less solitary custom has made the animal traditionally timid, and it is almost impossible to capture it alive. Since the only way by which vicuna wool could be secured was to kill the animals, for many centuries there was grave danger of their extinction, for the practice resulted in indiscriminate slaughter. The Incas of Peru rigidly protected the vicuna for this animal was highly regarded by them, but when the Spaniards arrived in 1536 a frightful slaughter of vicunas drove surviving animals into mountain fastnesses, where their descendants live today. All thought of conservation was forgotten until 1825, when the killing of vicunas was declared illegal, but permission was given to trap and then shear the live animals. Because of the wildness of the vicuna, this mode of obtaining its wool was found to be impracticable, and once more this animal was promiscuously slaughtered. This condition prevailed until 1921 when laws were enacted and enforced permitting the killing, under State license, of only a sufficient number of vicunas to keep the herds in proper balance for breeding purposes. This is the only fleece that is now available for fabrics.

The vicuna thrives only in inaccessible, rugged areas at an altitude of sixteen thousand to nineteen thousand feet, and its favorite habitat is the region of the Andes Mountains which traverses Peru, Northern Bolivia and Southern Ecuador. Here, feeding on coarse grass and native shrubs, it exists for an average lifetime of twelve years. In Peru, at an altitude of seventeen thousand feet, is the highest human habitation in the world, a shepherd's hut, modest token of an individual effort to domesticate the vicuna in its natural surroundings.

There are two distinct types of fiber on each animal: The long outer, or "beard," hair, which serves as a coat for the animal but is never used in the manufacture of fine cloth, and the innercoat of wool, which grows close to the skin, on the neck, under the shoulders and on the sides and under-portions of the body. As each animal produces only about four ounces of this fine, velvety fleece, it requires the yield of more than forty animals to provide fiber for a single garment of normal size.

The predominant characteristics of true vicuna wool are a beautiful golden-chestnut color, extreme fineness, silkiness and high luster. The wool is also strong and resilient, having marked elasticity and surface cohesion.

In the time of the Incas, the great value of vicuna wool was recognized, and it was so cherished that wearing garments made from it was restricted to rulers. Museums in Peru display shawls and other garments made by Inca weavers, which still retain their original softness and natural color. Even today, vicuna fiber is the rarest of textile fleeces, and in all of its history, it has never been a commercial commodity.

# ALPACA

ALPACA WOOL is obtained from a domesticated, goat-like South American animal, Llama Glama Paco, which, like the other members of the llama family of South America, is allied to the camel group of Asia. It is of more specific importance to the textile industry than is the llama. The alpaca is much shorter than the llama, rarely being more than three and one-half feet high, with a shorter neck well covered with hair. Its habits are similar to the llama, the chief difference being that the alpaca is not used as a burden carrier but is raised solely for its beautiful fleece.

It is believed that the alpaca has been domesticated for over two thousand years. For many centuries, pre-Inca Indians raised these animals primarily for food but learned, in a limited way, to utilize the fleece for locally used cloth, which in time developed into really exquisite fabrics. Most of the fabrics found in ancient Peruvian graves of the common people were woven from alpaca wool.

The alpaca is a mountain animal which thrives only on the higher western regions of the Andes Mountains in Peru and Ecuador. Although innumerable attempts have been made, it has been found impossible to acclimatize this animal to other parts of the world. Its favorite locale is at elevations of from fourteen thousand to seventeen thousand feet above sea level, seldom wandering lower than twelve thousand feet, in search of the coarse grass which would be inadequate forage for almost any other animal. The alpaca is able to withstand the rigors of such altitudes, not only because it is provided with a heavy fleece, but also because it requires relatively little oxygen for breathing and very little water to drink. It travels in flocks of from one hundred to three hundred animals, which are controlled so as to maintain a ratio of ten males to one hundred females. During the daytime alpacas are permitted to roam freely over the bleak and rather barren mountain slopes, but at night they are coralled in one of the numerous alpaca farms, many of which are owned by native Indians, who seem to be the only human beings who actually understand how to handle these temperamental animals.

There are two distinct types of alpacas: the huacaya, or bacaya as it is called in some districts, and the suri. The huacaya is larger and heavier than the suri and also in other ways more closely resembles the llama. The suri, as an animal which has had the advantages of generations of selective breeding, produces a fleece that is finer, more lustrous and more compact, bearing the same relation to other alpaca fleece, as merino wool does to that of other sheep. Although the length of the staple is practically the same, yet for the same period of growth, the comparative weights of the fleece yielded are: huacaya, five and one-half pounds, suri, six and one-half pounds. Notwithstanding this variance, approximately 90% of all alpacas are of the huacaya type, and only 10% of the suri breed.

The color of the long, fine, lustrous fleece of the alpaca ranges from white and gray, to fawn, red-brown, and even black, but the red-brown shade is most highly regarded. Since it is impossible to satisfactorily bleach alpaca fiber, its use is restricted to fabrics that are to be dyed a darker shade, but because of the wide range of the natural colors of the fleece, many pleasing combinations can be made without dyeing. The fiber is also water-repellent, has high insulating or thermostatic qualities and possesses about 300% greater tensile strength than does sheep's wool.

Fleece obtained from domesticated alpacas is similar to mohair and consists of two types, the coarse, medullated beard hair, and the soft, lustrous wool. The staple length of alpaca fiber is normally between eight and sixteen inches. It may be increased in length by permitting fleece to grow beyond the time for bi-annual shearing, for in a wild state the alpaca often grows hair thirty-six inches long. The alpaca is sheared once every two years, and each animal averages about ten pounds of fleece. The shearing operation usually is done in late November or early December, after the various flocks are gathered into a centrally located corral. Shearing is done by Indians who follow the crude primitive method of their ancestors. Then the fleece is taken to collection centers where it is sold in bulk to dealers, who first grade it by separating the fleece of the huacaya and suri and then sort it into the seven recognized alpaca colors of white, gray, fawn, light brown, dark brown, black and piebald. The last is a mixture of all the other colors. Through selective breeding, alpaca fibers have become even in quality and have undergone other technical refinements, but because of certain disadvantages, they are not, to any great extent, utilized as a general textile fiber. However, in addition to large native consumption, more than six million pounds of alpaca are exported annually from South America.

# HYBRID CAMELOID FIBERS

At various times, efforts have been made to secure a cameloid fleece that would retain the best quality of a given fleece, and by cross-breeding, combine it with a fleece of similar excellence in another species belonging to the same general family, producing a super fleece in a single hybrid animal.

The alpaca and the vicuna have been cross-bred in Peru, and hybrids have been developed which are taller than the vicuna and very resistant to cold. These hybrid animals are called paca-vicuna, when sired by the alpaca, and vicuna-paca, when sired by the vicuna. Although both types of animals grew fine, long hair, rated as a slight improvement over the pure alpaca, yet the quality of the fleece did not approximate pure vicuna hair, and the yield was only one-half as great as from either pure-blooded parent. These hybrid species are now almost extinct.

The alpaca and the llama have been cross-bred with more productive results, for, having similar habits and instincts, they would mix freely. Out of this cross-breeding have come two hybrid animals, each possessing characteristics in both appearance and fleece, which are a blend of those of their parents. The huarizo, sired by a llama, is sometimes used as a beast of burden and has a fleece comparable to that of the llama and not quite so fine as that of the alpaca. The misti, sired by an alpaca, is never used as a burden carrier and has a fleece like that of the alpaca in both texture and quality. The utilization of the fibers from these hybrids is practically the same as that of fibers from either parent.

# MISCELLANEOUS FIBERS AND FURS

China lamb wool, as its name implies, is derived from the Shantung lamb which is more generally known as China lamb. For several hundreds of years it has found pasturage in the wild, damp regions of Shantung, a province in east-central China. Here, for many centuries, these animals had been allowed to roam with but meager care from the natives, who were content to kill them for food and infrequently used the soft, silky wool for shawls and bright-colored cloth. It was not until about two hundred years ago that some foreign cloth merchants recognized the Cashmere blood strain in these carelessly reared animals, and after that, an effort was made to standardize the natural luster and soft texture of the wool. It was somewhat difficult, however, to impress upon the unintelligent Chinese farmers, the necessity for more scientific breeding and more care. Ultimately, however, they were made to realize the importance of this animal, and China wool found its place in the textile markets of the world, as a yarn suitable for outer garments. The animals are shorn once each year, and the fiber, although possessing many of the characteristics of Cashmere, is much longer, more rugged and is white, permitting a practically unlimited range of dyed colors.

Tibet wool resembles Cashmere wool and is obtained from the Tibet goat, which is much larger and stronger than its near relative the Cashmere goat. Although its yield of fleece is more abundant than that of the Cashmere goat, yet the wool is not so beautiful nor of such high quality.

Karakul sheep originated in the Karakul valley of Russia, near the Caspian Sea. Except when allowed to survive for breeding purposes, these sheep are not permitted to live long. The pelt of a prematurely born Karakul lamb produces costly broadtail, but from two to five days after birth the fur curls tightly and is known as Persian lamb. After more than five days of life the curls open, and the fur becomes karakul. Lambs of the same species are also raised in the Astrakhan province of Iran, and the pelts of very young lambs are called astrakhan while the fur of older lambs is called karakul.

The Angora rabbit, when domesticated, has a beautiful coat of fine, downy fur, used both for outerwear and underwear. Its fur was known to ancient Asian textile craftsmen, but even in those remote days there was a limited supply. In modern times the Angora rabbit has been raised in North Africa, and later, in France. Its fleece consists of relatively long fibers and is extremely fluffy and slippery. Because of this, it requires special processing in order to properly handle and spin it into yarn. The hair is almost exclusively pure white, although occasionally a few gray strands appear, but these are removed when the fleece is graded. To obtain Angora rabbit hair, each animal is usually hand combed. However, sometimes it is plucked to obtain as long a staple as possible. Angora rabbits have always been difficult to raise, and, as each animal produces but a few ounces of soft, fine, underhair, the total volume of Angora rabbit fleece is very small, making it one of the more expensive fibers.

The domestic goat of Europe provides a useful fiber only when it is given freedom. If the animals are permanently stabled under the modern system of intensified goat rearing, the hair has little value.

Cow and calf hair is coarse and stiff but is serviceable when mixed with goat hair or sheep wool for the manufacture of hair yarn. Cow hair fibers are from one-half to two inches long and have more epidermal scales than goat hair.

Horsehair is normally less than one inch long, is lustrous in appearance and gives elasticity to woven fabrics, but body hair is inferior to that obtained from mane and tail.

Hair fibers from the common rabbit, muskrat, beaver, squirrel, raccoon, deer and hog are of minor importance but are sometimes used in weaving cloth for specific purposes.

# ORIGIN OF THE NAMES OF WOOLEN FABRICS

A twill-weave fabric, made of wool yarn with a characteristic prominent diagonal rib on both sides of the cloth, is called *serge* from the Latin word *sercia,* which means *silken,* for originally, this fabric was made of silk. A smooth, glossy, wiry fabric, often called brilliantine, made from the hair of the Angora goat, is called *mohair.* This word comes to us from the Arabic word *mukhayyar.* An extremely soft woolen fabric called *cashmere,* gets its name from goats native to the *Kashmir* province of India.

*Gabardine,* a firm woolen material similar to whipcord, is Spanish in origin and obtained its name from a Spanish word which means *protection from the elements.* It was used in the Middle Ages as a pilgrim's cloak and quite appropriately is a coarse, loose fabric suitable for a cloak or mantle. *Pea jacket,* a coarse, thick, woolen cloth, sometimes of felt, comes from the Dutch word *piye.*

*Tweed,* a rough-surfaced, woolen material having a surface with a homespun effect, was once called *twill.* The name *tweed* originated accidentally when an invoice for twill cloth became blurred in the copy press and a cloth buyer read the word *twill* as *tweed.* As the cloth had been woven on the banks of the River Tweed, this seemed appropriate and the name stuck. *Cheviot,* a woolen or worsted fabric quite similar to serge, was so named because it was first made from the fine wool of sheep native to the *Cheviot* Hills.

A smooth, corded, wool fabric called *Bedford* cloth was first made at *New Bedford,* Mass. and so obtained its name.

*Beaver,* a fine woolen fabric similar to broadcloth, was so named because it was originally made to imitate the fur of a beaver.

*Melton,* a heavy, felted, woolen fabric used for riding breeches and overcoats, was originally woven at *Melton* Mowbray, a hunting district of England. *Covert* cloth, a medium-weight, woolen suiting, much worn by fox hunters, was so named from the habit of the fox to seek *covert. Jersey,* a plain, knitted, elastic fiber, usually made of wool but sometimes of cotton, and *kersey,* a heavy, pure-wool, double cloth, received their names from the island of *Jersey* where, since the days of Queen Elizabeth, women have spun these fabrics for their fishermen.

*Worsted,* made from long staple, evenly combed wool, was first spun in England in 1340 at *Worstead,* a parish of Norfolk, and so got its name.

The word *felt* comes from the German *falzen,* meaning to groove or join together, and accurately describes a characteristic of wool fiber. *Flannel,* originally made of wool, and having a soft, napped surface, gets its name from the Welsh word *gwlanen,* which means *allied to wool,* and in medieval times it was called *flannen.*

*Broadcloth* is a fine, smooth-faced, woolen cloth with a slightly napped surface usually of double width, or 1½ and 1¾ yards, as distinct from woolen ¾ yards wide.

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